THE BUILDER

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ANCIENT BUILDINGS AND THEIR PRESERVATION

THE Report of the Annual Meeting of the Society for the Protection of Ancient Buildings, held early in May, was prevented by the general strike from being fully considered at the time. The speeches of the Chairman (Mr. John Leighton) and Lord Burnham were so full of sound sense and constructive suggestion that it is worth while to insist upon them rather more fully than was possible at the time. The Society, now forty-nine years old, boasts a constantly increasing membership, and its activities have closely followed the principles inculcated by its originator, John Ruskin, who, on the opening of the Crystal Palace, in 1864, made the pathetic plea: "Is America not wide enough for the elasticity of our humanity? Asia not wide enough for its pride? Or, among the quiet meadowlands and solitary hills of the old land, is there not room enough for the spreadings of power or the indulgences of magnificence without founding all glory upon ruin and prefacing all progress with obliterations?" To Lord Burnham, as to all of us who are interested in our architectural heritage, the prospect of the future is full of disquiet. He reminds us that in no other country are the memorials of the past being obliterated so surely and so rapidly. In the words of the Chairman, "The Londoner can hardly fail to see that there is sweeping over the whole place an apparent frantic desire to remove all the characteristics that we have become familiar with. The beautiful things that have become matters of daily association with us; graceful shopping thoroughfares are being turned into architectural ditches of inappropriate commercial premises." And what is true of London is true of every town in these islands.

One of our greatest difficulties arises from the fact that the great eighteenth-century family seats are far too large for any private individual to keep up. They sacrifice homeliness and comfort to grandeur and monumental scale, and those that are not converted to institutional purposes too often fall into decay and become mere quarries for stone. The suggestion is thrown out that the State should be empowered to lease or purchase them at a figure fixed by an Arbitrator or Court of Arbitration. Such a course presupposes a will to acquire and, as Lord Burnham truly remarks, this has not so far been apparent in our national policy in regard to historic works of art. We are reminded of Matthew Arnold's dictum, that we are ruled by the Philistine and the Barbarian. When compared with ourselves Italy shines as a land of enlightenment and progress, and Mussolini himself takes the lead in the struggle against vandalism. For example, during the discussion in the Senate on the project for joining Venice to the mainland by a bridge for motor traffic, he roundly declared that he would never cross that bridge, and that if he did not he thought there would be a good number of other people who would not either.

The Italian laws for the preservation of artistic and natural beauty fall under three heads:—

(1) All buildings, such as churches, convents and ancient palaces, that are of artistic beauty or historic interest are scheduled at the Ministry of Fine Arts and in local centres. No alterations may be made to them without the consent of a provincial commissioner, with the right of appeal to the Government.

(2) Every picture, statue, and object of artistic beauty that is not by a living artist is listed, and may not be sold or exported without permission. In the event of an offer for purchase the Government must be given first refusal. If found at the frontier it is confiscated, and if it disappears without good reason from the owner's possession the owner is punishable.

(3) No woods or forests, avenue of trees, or even single trees if conspicuous in the landscape, may be cut down, nor houses built so as to obscure or injure well-known landscapes.

Who can doubt that if these laws were introduced here it would be to the great benefit of our descendants, and who can question that this country is far too short-sighted to tolerate their adoption in full? Only by gradual steps can we follow Italy's example. Lord Burnham suggests that the Ancient Buildings Act should be amended to include all buildings of artistic and historic interest, and that it should be compulsory that the Office of Works or the County or Borough Council concerned should be given the opportunity of purchasing or leasing them at a fair price before they could be transported or destroyed. This proposal is eminently reasonable, but in practice, certainly at first, we fear that local councils would be slow to avail themselves of their powers, since only a very few possess the slightest "will to acquire" anything of the kind if it involves any expenditure of money. Admittedly it may sometimes be really necessary to remove an ancient building, and it is not with those cases which are indisputable that the Society is concerned; it is rather with those instances where the will to preserve seems atrophied and feeble, and where the most questionable grounds for removal are cited as reasons for demolition. The Whitgift Hospital is a case in point. Our public officials do not appear as a rule to regard the retention of such buildings as an end so desirable that every other possibility should first be thoroughly sifted, and were it not for our Society for the Protection of Ancient Buildings there would exist no focus where enlightened public opinion could make itself felt, and England would even now be immeasurably the poorer in historic buildings.

The cry everywhere is for economy, and if in any country this is necessary it must be in Italy, and yet the Municipality of Florence has spent over a million lire in restoring the cloisters of Santa Maria Novella, and similar works have been carried out in Perugia, Gubbio, and Assisi. Italy recognises that economy is best effected in personal extravagance and luxury and not in saving exiguous sums on the preservation of the irreplaceable heritage of the past. In England luxury appears on every side, and our first economy is to cut out the relatively trifling cost of such "non-essentials" as art treasures and historic buildings. Our national attitude is comparable to that of the individual who spends huge sums on motor cars, gambling, and lavish dinners, and regrets that he cannot afford to keep his house painted and in repair.

If any real improvement is to be effected we must look to the Government and the local authorities. We accept it as an axiom in this country that we cannot legislate ahead of public opinion, and we cannot, therefore, emulate Mussolini and make people reasonable by informing them that they must do this and that; but we suggest to the Government that public opinion on this subject is daily becoming stronger. It is reflected in the increased membership of the Society for the Protection of Ancient Buildings, and in public indignation over the threat to Waterloo Bridge, which made itself felt with no uncertain voice. We hope that the Government will take adequate steps to meet this public demand by framing legislation designed to stop the destruction and export from which our buildings of historic and architectural value stand in constant peril.

NOTES

The R.I.B.A. Annual Dinner.

ARCHITECTS will be gratified to learn that His Royal Highness The Prince of Wales has graciously consented to be present at the annual dinner of the Royal Institute of British Architects which will take place on Tuesday, November 23, and to present the Royal Gold Medal for Architecture for the year 1926 to Professor Ragnar Ostberg. The Prince has frequently shown his interest in and appreciation of the architectural and building arts, and his presence recently at functions of the Surveyor's Institution and the Royal West of England Academy will be readily recalled. His Royal Highness, as a large property owner, has shown a constant concern for the welfare of architecture by setting a high architectural standard for the buildings under his control, and his presence at the dinner of the premier architectural institution of the Empire is at once a compliment to architects, a recognition of the importance of architecture in the life of the community, and a further witness to the interest which the Royal Family has never ceased to manifest in the arts.

The Late Sir Charles Ruthen.

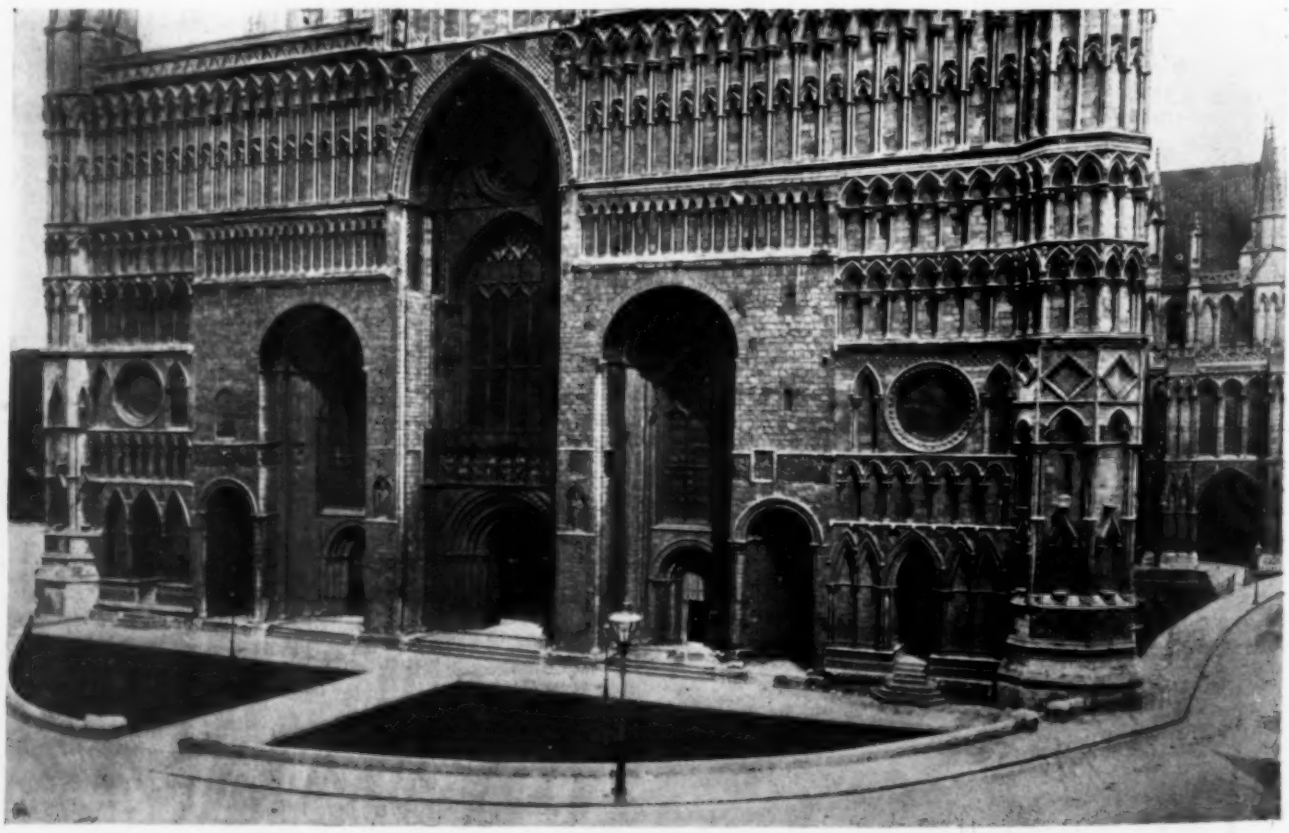
SOME of the obituary notices we have seen of the late Sir Charles Ruthen unfortunately refer to the cause of his resignation of the office of President of the Society of Architects, and the impression is left that, inasmuch as the deceased was obliged to resign and also to criticise the attitude of the profession towards the National Housing schemes, his criticisms were justified in the main. The correspondence which followed his address in which he said, "the tremendous effort to house the people was bled white," showed how widespread was the indignation caused by such wholesale and ill-advised generalisations. In so far as there was any justification for them at all, the Government of the time was far more responsible, for when they called for houses fit for heroes and asked for a superior standard of design and accommodation, architects did their best to respond. Though much very excellent design has resulted from architects, there can be no doubt that in the main the profession has benefited far less than they might have hoped to do, and that in some cases they have been very badly requited for an immense amount of design for housing schemes which did not materialise.

Professor Lethaby's Lecture.

AT the Conference of the Industrial Welfare Society Professor Lethaby spoke very wisely on "Industry and the Notion of Art," pointing out that labour was a method of discipline, and that the joy in labour having been so much lost, philanthropy "set up the idea of turning away from it in books, billiard clubs and sport," adding that as a result we had "gone near the creation of a psychological hatred of labour." Nor can labour be other than this if divorced from its adequate return of interest. At the same time we share the lecturer's alarm at the acceptance of "sport," football, cricket, the cinema—though good enough in themselves—as providing any adequate alternative to the loss of pleasure and interest in work. We also notice that this alternative would appear to be founded on the idea that these distractions prevent people from thinking! This is rather Napoleonic reasoning, and reminds us of the Emperor's view of religion, that "it kept the people quiet!" Such arguments are seen by most of us to be specious, and we share to the full the lecturer's anxiety at the eradication of the instinct of labour. Shakespeare tells us, "The labour we delight in physics pain," and the kind of excitement arising out of the distractions of sport, betting, billiards and the cinema leaves very insecure grounds for any complacency, as contentment cannot be found except in its right relation to labour, through which it is chiefly enjoyed.

Mural Painting.

AMONGST the drawings which are to be submitted by candidates for the Edwin Austin Abbey Scholarships (particulars of which have already been given in these pages) we are glad to notice the inclusion of original decorative schemes for an "existing building, or part of a building (such as a Church, a Town Hall, a Theatre, a School, a Private House)," as it is very important that schemes should not be prepared in the air, but be founded on actual conditions. In preparing the scheme for an existing building the design is more likely to be practical and conditioned by the actual requirements, such as lighting, scale, distance from the eye, &c., than when without an actual building on which to

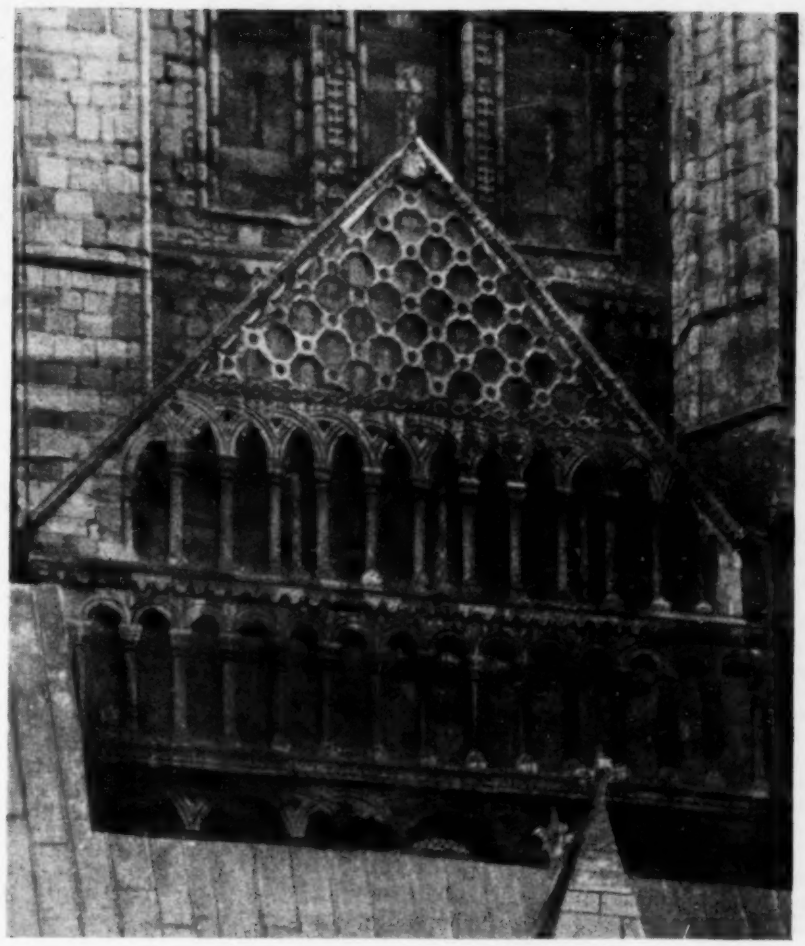


Lincoln Cathedral: West Front. *(See article beginning on p. 480.)*

found the design. We attach a good deal less importance to another condition under which the candidate must submit studies from Italian examples, such as models in the Victoria and Albert Museum, &c. Not that we deprecate acquaintance with the old masters of mural decoration, but that it is of such importance to relieve the arts of the bias of outworn precedents. We know to the point of exhaustion what can be learned from Renaissance ornament, and what we need to-day is a more spontaneous, youthful and virginal approach, freed from the accumulations of time, which tend to strangle it with the dead hand of precedent and authority. We are much more likely to get a living mural decoration when it speaks more freely in the language of its own time, expressing its own interpretations, no less noble than any other.

The Rise of Miami— FIVE years ago Miami, Palm Beach, and the Florida coast in their neighbourhood were quiet agricultural districts in a beautiful setting of orange groves and tropical fruit farms. Then they were "discovered" by land agents, who realised the possibilities of the district as a winter resort for jaded business men from the northern States. It was "boosted" as perhaps no resort has ever been boosted before. Press agents lauded its praises with a vehemence compared with which the Deauville and Lido propaganda in our own Press fades into insignificance. Speculators descended on the place in hordes. Plots changed hands with remarkable rapidity, often several times in one day, and as a rule at ever-increasing prices. Plots were sold in the streets amid scenes resembling the "street market" in Throgmorton-street at the height of a rubber boom.

—and Its Fall. THE land is so flat that special motor roads had to be built to take the residents to the sea when the tide receded, and artificial lakes were built to bring the sea nearer the town. Flimsy buildings were put up by the thousand to accommodate the advance guard of the development. Many of the houses built for the wealthy visitors were of flimsy construction too, for their occupation was only seasonal. Then followed huge and palatial hotels and stores, reaching twenty stories in height, and erected at a speed unheard of in the country of rapid construction. And last week-end came the tragic fall, as spectacular as the rise. Fifteen hundred or so people were killed in a hurricane which is reported to have caused damage to the extent of £40,000,000 on a site that five years ago was farmland. The "realtors" had made fortunes, the purchasers had lost fortunes. Steel-frame buildings, we are told, were buckled and twisted out of recognition by the force of the hurricane. It is to be hoped a thorough inquiry will be held to ascertain how much of this great loss of life and damage to property is due to faulty design or careless workmanship in the hustle to get the buildings erected. When one remembers the way in which steel-frame and concrete buildings resist earthquakes in Japan, and the illustrations we gave last year showed how little effect the severe earthquake at Santa Barbara had on well-designed and soundly constructed buildings, one cannot help thinking that the hurry to get rich quick has been largely responsible for the tragedy.



Lincoln Cathedral: North Gable.

Co-operation of Architects and Craftsmen. WE note with satisfaction that a Consultation Board representative of architects and operatives has been established, consisting of four members of the Royal Institute of British Architects and four delegates of the National Federation of Building Trade Operatives. Such questions as education, apprenticeship and means of promoting a revival of craftsmanship are stated to be among the subjects for discussion by the Board. It is to be hoped that the labours of this body may be successful in arousing among workmen a more lively interest in the higher aspects of their work and also may be a means of bringing architects into closer relation with the practical possibilities of craftsmanship.

The Record Skyscraper WE learn that Detroit, U.S.A., the home of the American car industry, is to gain a new distinction—that of having the tallest building in the world. The "Book Tower," which is 873 ft. high, will have, when completed, 85 stories, four of which are to be below ground level. A distinctive feature will be a car "park" capable of housing comfortably a thousand cars. All this is depressing. We can understand the need for many-storied buildings on Manhattan Island, where houses are built upwards because they cannot be built outwards, but this building of skyscrapers, as in Chicago, Detroit and San Francisco, where there is ample room for lateral expansion, is sheer foolishness. Very high buildings have already been condemned in New York as a menace to the health and Detroit, situated in the middle of flat farm land, is already suffering from appalling street congestion.

Unemployment. "I put my name on the unemployment register on August 25 last," writes a correspondent who is an architectural assistant, "and on September 8 I counted thirty-nine additional names." We trust that our correspondent's unhappy experience does not truly reflect an overcrowded condition of the architectural profession. We prefer to believe that architecture, together with many other professions as well as industries, is suffering from the present industrial depression, so seriously aggravated by the prolonged coal dispute, the settlement of which should do much to reduce unemployment.

GENERAL NEWS

Professional Announcements.

Mr. R. Woodhouse Beales, architect, of 120, London-road, Ipswich, has commenced practice at the above address, and will be glad to receive manufacturers' catalogues, &c.

Mr. A. T. Gooseman, late borough engineer of Blackburn, has been appointed to the position of city engineer of Leicester, in succession to Mr. E. G. Mawbey, who is retiring after 37 years' service.

Mr. F. P. Kindell has been appointed surveyor to the Barnes U.D.C.; and his position as surveyor to the Friern Barnet Council has been filled by Mr. John M. Gameson, late surveyor and water engineer to the Ilkley Urban District Council.

Mr. Godfrey Evans, B.A. (Cantab.), has resigned his position of Assistant Secretary of the R.I.B.A. in order to take a similar position in the Surveyors' Institution; and recently, upon the invitation of the President, he met some of the members of the Council for a formal leave-taking. Mr. Dawber asked his acceptance of a cigarette case as a reminder of the time he had spent at Conduit-street, and expressed in the most cordial way the goodwill of all who knew his work there.

Architect's Estate.

The late Henry Leslie Paterson, of Sheffield, architect, left £7,385, with net personalty £7,018.

New Church at Reading.

£10,000 towards the total cost of £12,000 of a new Roman Catholic Church at Reading has been subscribed by Mr. Powys-Lybbe, of Streatley.

Extension of Dartmouth Embankment.

Plans have been prepared for the extension of Dartmouth Embankment on the water front by about a sixth of a mile, making a total length of half-a-mile, at a cost of £40,000. The Embankment will form a continuation of the main road from Torquay and Paignton.

New Bridges Over the Trent.

Speaking at a luncheon given to the touring members of the Garden Cities and Town-Planning Association at Nottingham, Mr. Wallis Gordon, the City Engineer, announced that to deal with the traffic problem two new bridges are to be erected over the Trent, one at South Wilford and the other at Radcliffe.

Proposed Sugar Beet Factory.

An intimation has been received by Shropshire farmers that, provided 8,000 acres of sugar beet are guaranteed by December 15, a beet sugar factory will be erected between Shrewsbury and Wellington, at a cost of about £260,000, to be completed by October next year in readiness to take the 1927 crop.

Nottingham Masonic Hall.

Plans for new Masonic headquarters have been prepared by Mr. Claude E. Howitt, A.R.I.B.A., to be erected on a site in Belgrave-square, Nottingham, adjoining the present buildings of the lodge. The cost of the scheme is estimated at £60,000, and the work will commence as soon as a sufficient sum of money has been paid into the fund.

Roman Coins Discovery.

Four hundred Roman coins have been found buried under a square stone 3 ft. deep, in a sand pit at Fleetwood. All are of Imperial coinage, and the find is of historic importance, as it gives support to antiquaries who assert that Fleetwood is identical with the Roman port of Portus Sentantiorum. In 1840 a similar find was made at Rossall, on the other side of the river.

Housing in the Free State.

Under the Housing Acts passed in the Dail in 1924 and 1925, 8,000 houses have been built in the Free State, and the total amount of grants made in respect of them was £625,000. The Act passed in 1926 provided for a continuation of the grants, with the result that a total sum of £900,000 has been made available for this purpose.

Ellesmere College Memorial.

Sir Aston Webb has designed the Memorial Chapel at Ellesmere College, Shropshire, which is intended to serve as a Memorial to old Ellesmerians, especially to those who fell in the war. The Chapel, which is to be in a style to accord with the present school building, is to be proceeded with at once, and the foundation stone is to be laid by Sir Offley Wakeman, Bt., on September 29.

Architects' Defence Union.

With reference to the proposed Architects' Defence Union, it is intended to call a general meeting of architects to discuss the proposals and to sanction the establishment of the new body. This meeting will be held at the R.I.B.A., 9, Conduit-street, W. 1, at 6 p.m., on October 18. The new Defence Union will not be limited to members of the R.I.B.A. and its Allied Societies, and all architects are therefore cordially invited to be present at this meeting.

Informal Illustrated Lecture on Architecture for Workers in the Building Trades.

The Council of the R.I.B.A. are holding an informal illustrated lecture on Architecture confined to workers in the building trades. This lecture will take place on Thursday, October 7, at 7.30 p.m., at 9, Conduit-street, W.1. The subject will be "The Job," and the lecturer will be Mr. L. Sylvester Sullivan, F.R.I.B.A., Hon. Secretary of the Board of Architectural Education. All men employed in the work of building are cordially invited, admission being free. Buffet refreshments will be served before the lecture.

OBITUARY

We regret to record the death of Mr. Arnold J. T. Ellison, L.R.I.B.A., secretary and treasurer of the Preston Society of Architects, Surveyors and Civil Engineers.

We regret to announce the death of Mr. C. E. Sayer, A.R.I.B.A., on August 17, at the age of seventy-two. Mr. Sayer was elected an Associate in 1881. He was the Tite Prizeman in 1879, and gained the Institute Medal Prize in 1892 for his essay on "The Fireplace and its Accessories." As an architect he was actively engaged in the improvement of and additions to many country houses, and among his works were Fowey Hall, Cornwall (1900) and Helperby Hall, York (1915).

We record with regret the death of Sir Charles Tamlin Ruthen, which occurred on Sunday last at Swansea. Born on October 22, 1871, the son of Mr. John Ruthen, of South Shields, he was articled, in 1886, to Mr. Mathew Hall, of South Shields; and in 1890 was appointed assistant surveyor to the Swansea Council. Six years later, in partnership with Mr. E. G. Allen, F.R.I.B.A., he was responsible for the Swansea Exchange Building, and in London for the remodelling of the Hotel de Provence and of the Manchester, Bedford Head, and Piccadilly Hotels. He designed also both the building and the internal decoration of the Kit-Cat Club, W. He was knighted in 1919, and in 1921 was appointed Director-General of Housing. As a result of a tour on the Continent for the purpose of studying methods of house construction, he read a paper to the Society of Architects, of which he was President, criticising architects for the failure of the national housing scheme. It has been stated on reliable authority that Sir Charles was unaware of the presence of the Press, and, as a result, strictures which were intended solely for the ears of the Society, gained widespread publicity. As it was, a general meeting of the Society of Architects was called in protest, and Sir Charles resigned.

COMPETITION NEWS

The R.I.B.A. (Henry Saxon Snell) Prize, 1926–1927

The attention of competitors is called to the fact that on page 28 of the current R.I.B.A. Prizes and Studentships Pamphlet the list of drawings required for an Isolation Hospital includes an "$\frac{1}{8}$ in. detail of a sanitary block and any special feature of the design." This should read "$\frac{1}{4}$ in. detail, &c."

Swimming Pond, Dunleary.

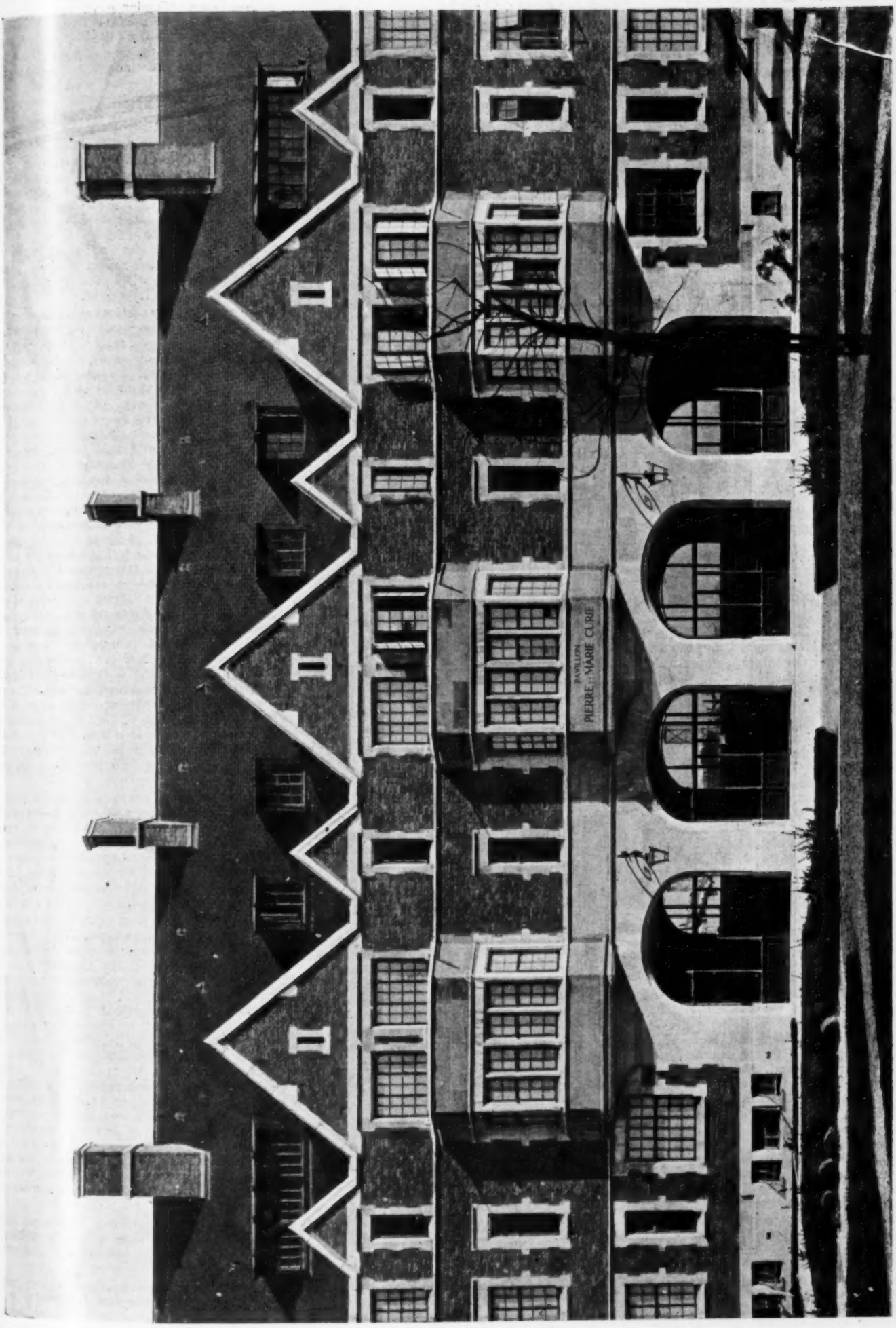
The U.D.C. has decided to submit to the Construction Committee a proposal to provide a full-sized swimming pond at the local bath, and to empower them to offer a prize to architects and engineers for plans.

COMPETITIONS OPEN.

	Particulars published in "Builder."	Sending-in date.
Plan for construction of Conference Hall, for League of Nations, Geneva. International Competition, Sir John Burnet being British representative on Jury of Assessors.	July 23	Jan. 25 1927
New Offices for Scottish Legal Life Assurance Society, Bothwell-street, Glasgow. Mr. John Keppie, A.R.S.A., F.R.I.B.A., assessor ..... (Date of application now past.)	Aug. 6	Oct. 30
Daily Mail Ideal Houses Competition in two sections:—(A) houses costing £1,500; and (B) houses costing £850. Prizes: £150, £100, and £50. Apply Secretary, Ideal Houses Competition, 130, Fleet-street, London, E.C.4.	Sept. 10	Nov. 30.
Academy, Perth. Open to architects practising in Scotland. Premiums: £100 and £50. Mr. James D. Cairns, assessor. Apply Mr. R. Martin Bates, Education Offices, Perth. Deposit £1 1s.	July 23	Jan 3. 1927
Edwin Austin Abbey Memorial Scholarships for Mural Painting. Two Minor Scholarships of £125 a year each, and one Major Scholarship of £250 a year. Candidates must not be over 25 and 27 years of age for the respective Scholarships on December 31 preceding the competition. Apply Secretary, Edwin Austin Abbey Memorial Scholarships, Chelsea Lodge, 42, Tite-street, London, S.W.3	June 11	Feb. 15 and July 1, 1927.
Town Hall Extensions and Public Library Building, Manchester, for the Corporation. Architects of British nationality invited to submit designs in preliminary competition. Applications for conditions should be made to Mr. P. M. Heath, Town Clerk, Town Hall, Manchester, accompanied by deposit of £1 1s., returnable on receipt of *bona fide* designs. Assessors, Messrs. T. R. Milburn, Robert Atkinson, and Ralph Knott, FF.R.I.B.A.	Aug. 20.	Jan. 3, 1927.
Rome Scholarship and Henry Jarvis Studentship. Apply for programme to Mr. Evelyn Shaw, Hon. General Secretary, Office of British School at Rome, 1, Lowther Gardens, London, S.W.7, not later than October 15	—	—

Merton Abbey Excavation.

The site of what was virtually the first English Parliament is being laid bare by Lieut.-Col. H. F. Bidder, who, after years of patient work, has excavated parts of the ruins of the ancient Merton Abbey on factory waste ground at Merton. The date of the Abbey's charter is 1121. Here Henry III presided over the Council of Barons who passed the Statute of Merton, the first Act of Parliament in this country, in 1236. As a result of the excavations, a committee has now been formed to acquire the main portion of the site and bring the ruins above ground, when the place will probably be made into a kind of public garden.



The Canadian Pavilion, Cité Universitaire of Paris.

MONS. L. RECHMANS, Architect. (*See p.* 504.)

LINCOLN CATHEDRAL

A RESTORATION OF THE WEST FRONT TO ITS NORMAN ASPECT.

BY R. E. M. COOMBES, A.R.I.B.A.

THE great restorations now taking place at Lincoln Cathedral have made possible the examination of much interesting and previously inaccessible Norman work, and full advantage of this has been taken for the collection of the subject matter of this thesis. The main portion of the northern half of the west front, cased in as it is by mason's scaffolding, has afforded a unique opportunity for a close study of what remains of the work of Remigius and his Norman successors, and for a reconstruction of this part of their scheme. This Remigius or Remi (of Rheims) was consecrated Bishop of Dorchester on Thames upon the death of Wulfwy in 1067. Realising the disadvantages of Dorchester as the seat of his See, he transferred it to the more central and illustrious city of Lincoln. The transference seems to have taken place in the year 1073. He secured a grant of land from William I, situated in the south-east corner of the Roman part of the city, and upon which stood the Saxon church of St. Mary Magdalen. Upon the demolition of this church he laid the foundation stones of one of the most glorious of English cathedrals.

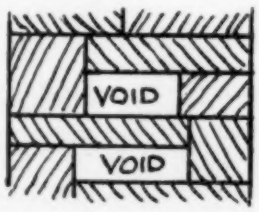
Sternness and severity were the keynotes of his design, portions of which, to this day, stand out as the most striking features of the whole composition of the façade. Evidences of his plan have lately been discovered, and a record of its general outline has been marked upon the present floor of the Cathedral. The building was of the cruciform type, complete with nave, choir, aisles, and shallow transepts, the whole occupying a length of some 300 ft. It would be but conjecture to reconstruct the whole of Remigius's church from such meagre material as mere outline of plan, but the existing portion of the west front, the bases of the two towers, and the first bay of the nave offer the substance from which may be built up a reasonably accurate result. The very existence of this portion can only be explained by the lack of funds of the later Gothic builders, who were thus checked both in the complete demolition of the old, and in the building in the entirety of their new designs. They merely had to content themselves by enlarging and enriching the Norman façade of Remigius's work. Of this, little remains unaltered, and from a Norman point of view, unspoiled. The three large deep recesses with their plain unadorned arch rings are his work, and from these alone may be gathered the severe nature and castle-like appearance of the first Cathedral. The date of consecration of his completed church was May 8, 1092, but Remigius died four days previously and the postponed ceremony was carried out by his successor, Robert Bloet. The intention is not a reconstruction of this simple but massive structure alone, but of the more decorative and finer work of Alexander the Magnificent (1124), in conjunction with and intermingled with the earlier conception. The classification "Norman" will, therefore, include the work of both builders, and the drawings illustrate the appearance of the building *after* Alexander's alterations had taken place.

To pick out hard and fast lines as to where Remigius ended and where Alexander commenced would be extremely difficult and of little real interest, owing to vagueness, lack of adequate data, and a savour of the conjectural. But comparisons can be made. These comparisons are based upon, firstly, the dressing and facing of walling stones; and, secondly, upon the style of arches, mouldings, capitals, and the many minor differences which, through study and classification, mark definitely the period in which a building has been erected. The rough hammered face of the exterior stonework is of course common to both periods; the later stonework is indeed finer and more advanced, and shows that even in the intervening twenty years or so the workmen had more knowledge of their tools. Again, the size of the mortar joints had been reduced, giving an appearance of more solidity and better craftsmanship in the masonry of Alexander. Stones of the earlier dressing marks, however, can be found intermingled with the later, and even to stretch a point to the limit of absurdity, there is actually a Norman dressed stone in the double arcade of the south aisle of St. Hugh's Choir. However, on looking at the front elevation and classifying *en masse*, it will be seen that up to and just above the large recesses on the exterior face of the wall is the work of Remigius, for the stones are rougher, the joints thicker, and the capitals and arch mouldings coarser, so that altogether there reigns a feeling more primitive. The three entrances were naturally inserted later.

It may be of interest to study the theory of one Charles Wild, a writer and great architectural authority, in his book, "Lincoln Cathedral," compiled in 1819. He states that Remigius built the whole of the existing façade (complete as shown in the drawing), and that Alexander merely added the three west doorways into the nave and carried out extensive vaulting in place of the wooden roofs destroyed by fire during his bishopric. Whence he obtained the foundation to his theory is a mystery, for he certainly could not have examined the work thoroughly himself, as it is surely obvious to all who have the slightest acquaintance with architectural principles and historical sequence that the builder of such a stern composition as the north and south recesses could not possibly have designed, for instance, the far advanced and decorative work portrayed in the first and second tiers of arcade on the north tower. The presence of interlacing arcades, both on the north and south gables, and the west front, undoubtedly point to the work of one mind. The arch mouldings are the same, the base mouldings are the same; therefore, to classify the north and south recesses and the four apsidal niches with this work is surely a grave error.

The gables, the towers, the rows of interlacing arcades, are undoubtedly the work of that later builder, Alexander. There is no suggestion that Remigius did not construct towers and gables; his foundations and general lay-out point to their existence. They were never decorated in such a manner as those seen on the drawing. Neither was the existing decoration added afterwards—that is, elaborated upon the face of Remigius's gables—for both externally, and more conclusively internally, the character of the stonework is of a later date. These few general observations divide with reasonable accuracy the work of the two great builders.

Before attempting a definite pictorial restoration both of work *in situ* and work inferred, a clear idea is necessary of the general methods of construction and enrichment employed at that time. It is due partly to the haphazard and careless workmanship of the masons and wallers of that date that, in the minds of experts, the safety of the north-west tower is now so dubious, and that such elaborate and thorough overhauling and strengthening have been rendered necessary. The boring of the walls in connection with the grouting has brought to light the system of those days, and the accompanying sketch shows how truly unscientific it was.



The spaces were filled with loose rubble and dirt, and occasionally a little mortar, and judging by the enormous quantity of grout pumped in the number of these spaces must be very large. Mention may be made here of the extraordinary abundance of such a peculiar material as oyster shells. Their presence was first discovered in the joints of arch voussoirs and imposts, and the first conjecture would be that for some extraordinary reason some builders at a later date had used them to wedge up loose stones by hammering them in from either side. That theory, wild as it may sound, was negatived by their discovery in the centres of enormously thick walls. Consequently, it could only have been in the Norman period that these shells found their way in. This matter may be of little consequence, and is mentioned to emphasise additionally the fact that the æsthetically strong, wide-jointed style was, perhaps, too elastic to be taken too high and to be loaded too heavily. That this was overlooked at the time of building is another reason why the present grave situation has arisen, and the safety of the tower has become imperilled.

The present upper portions of both towers were added in 1380, and seemingly no additional preparation was made to receive them, and they were merely built up upon the then existent Norman substructure. So massive did this substructure appear that no doubt was entertained as to its capabilities to carry the additional stress. The south-west tower shows signs of this overloading, and cracks, although not so serious as those in the north-west tower, are to be found, and no doubt hastened the removal of spires from both towers towards the close of the eighteenth century. But all through the ages the north-west tower has caused considerable anxiety to the various builders, the root of the trouble being, as far as can be gathered, a rift in the limestone formation on the north west corner, and an attempt at bridging over this fault can be seen on the north elevation; the bridge or arch is clearly of Norman construction, and only shows up the rather foolish decision of the Gothic builders to trust the already overstressed foundation to so much additional weight. Nor is this the only fault which critics have found with these early English builders. Many a commentator and critic has spoken adversely of the despoiling effect of the great screen wall (see p. 476) which crowns the old Norman façade. It is a matter of opinion, however, as to whether the reconstruction on the drawing is superior to the now existent elevation.

The whole of the work was carried out in Lincolnshire limestone with but few exceptions (such as Purbeck marble shafts), a stone which has been extensively used in the neighbourhood. Whence it came is a mystery, as not anywhere is to be found a quarry or even quarries which could supply such a gigantic quantity of stone.

The accompanying comparisons will distinguish the work of Remigius and Alexander—(p. 482 (north-west doorway detail). A capital from the north-west recess, which is distinctly Corinthianesque and marks the last stage of Classic influence. The volute is clearly discernible and the uncarved block in the centre is reminiscent of the rosette. This type of capital was used entirely by Remigius, and although it occurs again in the interlacing arcades of Alexander (p. 481), its presence was probably due to a repetition of existing work. Figs. A, C, D are typical examples of the later work, and are taken from the north gable; an advance both in design and execution is here very obvious. Capitals taken from the very late work of the north-west doorway can be seen on the ½ in. detail of that portion. The same fervour and striving for advancement is evident from examples of such mouldings and their enrichment.

The plain, unadorned and unrelieved arch mould over the two western recesses is Remigius's work, and that of Alexander is illustrated on p. 481.

It will be seen upon comparing the photograph and the elevation of the west front on p. 488, how much of the original work remains to this day, and what was destroyed to make way for the screen wall. The north, south and central gables on the west front are reconstructed, as also are the small openings in the three recesses.

The remainder of the reconstruction only consists in the stripping off of the Early English work and exposing the original.

Concerning the central gable, it may be said that it is purely conjectural, as nothing is left to show its form, height or enrichments. I prefer to think that it was not decorated to the extent of the other two on that elevation, but presented a bolder, plainer face. Of its height, nothing can be said but that it must have dominated. The pitch of the roof is taken as similar to that of the others, which cannot be far from correct. At that time a pitch of from 40 deg. to 47 deg. was in general use, and none of the examples, *i.e.*, Peterborough, Hereford, Ely, Iffley, &c., shows any variation to that rule. In addition to the above reasons, the central recess which virtually exists up to the level of the capitals, and upon which a semi-circular arch must be struck, fixes roughly the heights and form as shown.

The north and south gables can be reconstructed with far more definite and concrete reasons. In the space marked "J" on the section and on the main wall of the tower, there still remains the stone "flashing" indicating the exact position where the old gable roof ran into the tower. The "flashing" consists of a series of stones bedded in the wall and running to the rake of the roof, splayed off on the outer top side. The stones are 3 in. deep and project 5 in. By means of a dumpy level used, I fear, in a very unorthodox manner, it was possible to discover that the apex of this "flashing" was at exactly the same level as the existing gable ridge on the north side. This seems to show that the two gables on the west front are replicas of the two gables which now remain. There is one point which is ignored on the setting out of these gables. The flashing on the north rake showed a break about half way down of 9 in. outwards, and then in a gradual curve picked up the point at the bottom at which, had the original rake continued, the flashing would have culminated naturally. The reason for this I fail to understand, as a curve of this description seems so inconsistent with Norman construction.

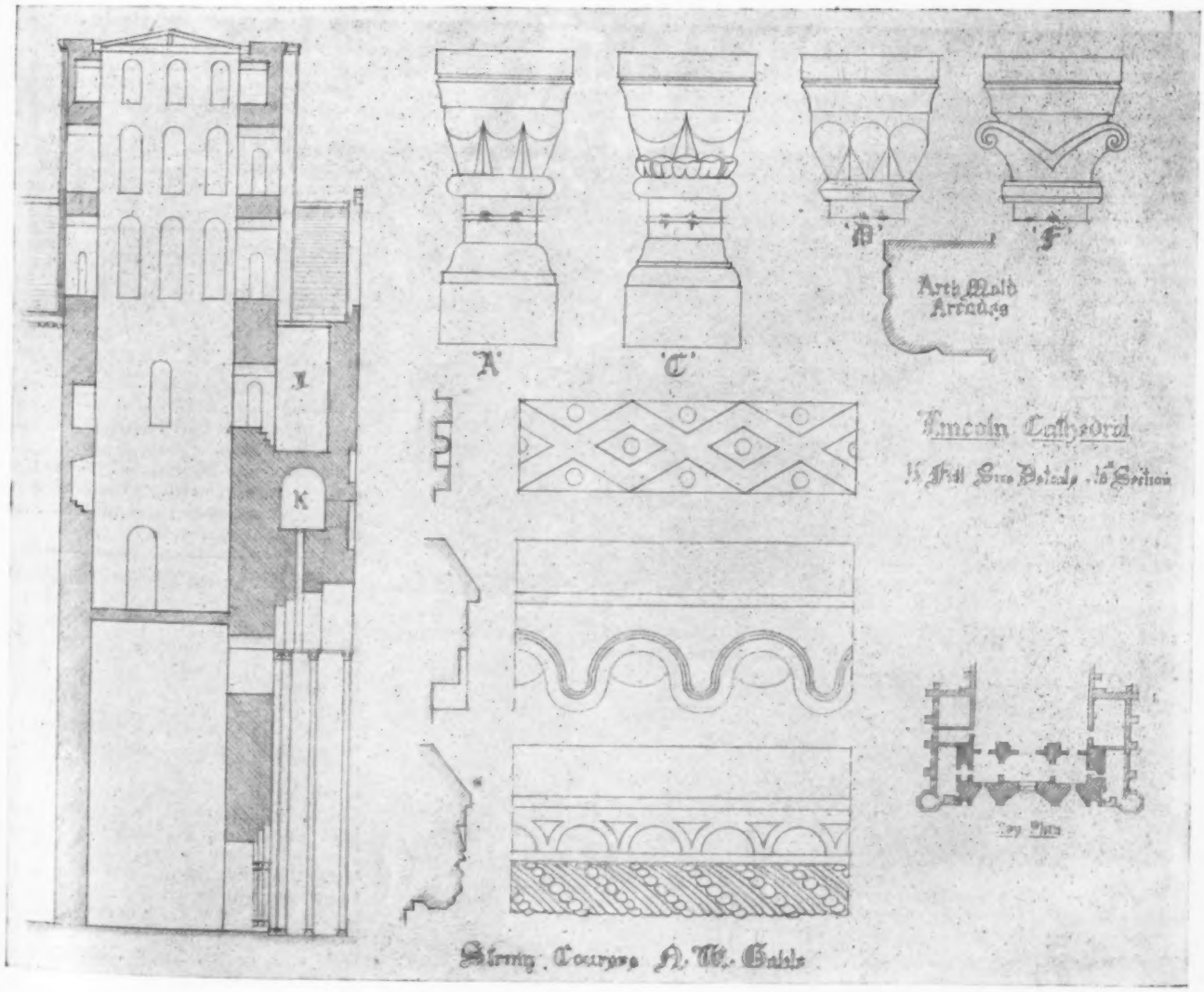
The builders may, of course, have attempted to avoid cutting through the base of the end column of the little arcade, but as this arcade seems to be contemporary with the work on the gable itself, this theory seems to be rather negatived. The small arcade mentioned above does still exist, and the break certainly does occur in a position consistent with the theory; but I do not think the builders would have sacrificed the raking lines of their gables on the front for such a small reason. On the other hand, they may have bulged the roof, but this would have been of most unworkmanlike construction, and consequently such supposition may be dismissed.

The towers, as may be seen from the photograph, are obviously Norman up to the point indicated, and a suitable projecting capping is only needed to make them appear as they did in those days. The rough-faced Norman stones terminate internally as does the design externally. In addition to that, nowhere in the upper portions of the existent towers could be found any Norman faced stones. This emphasises, I think, the fact that the builders did not remove any part of the then existing towers, but merely superimposed their design upon the original one. Had they demolished any part, the old stones would surely have been utilised. No indication could be found internally of the construction of roofs, but no doubt it was of heavy timber covered with lead.

The presence of the above-mentioned small arcades, wedged in between the gables and the staircase piers of the towers, appears very odd. The arch moulds are in every respect similar to those of all the other arcades, and point to their being of contemporary construction. It certainly seems as if they originally ran right across, hence indicating an alteration in design of the gables. But as against that they are of peculiar construction, a construction which points to a later date. The arches are pointed, and are cut from one stone; surely, this is the birth of the pointed arch? The capitals are no more advanced, and, as stated above, the arch moulds are exactly similar. The solution may be simple. A blank awkward space had to be filled up, but, compared with the geometrical setting out of the gables, this appears a very crude way of doing it. And yet it is, to my mind, the only solution, as had they, as originally suggested, run right across, surely a similar pointed arcade would have appeared somewhere in the upper parts of the towers. A new idea, such as this, would hardly be ignored, when the striving for advancement was so strong and powerful. It is this advancement which makes this west front so intensely interesting. One has the Corinthian feeling in Remigius's early work—crude, it must be admitted; then all the phases of Norman work, getting finer and more elaborate, and culminating in the glorious doorways; but where to place with accuracy the pointed arch arcades in this sequence is indeed difficult.

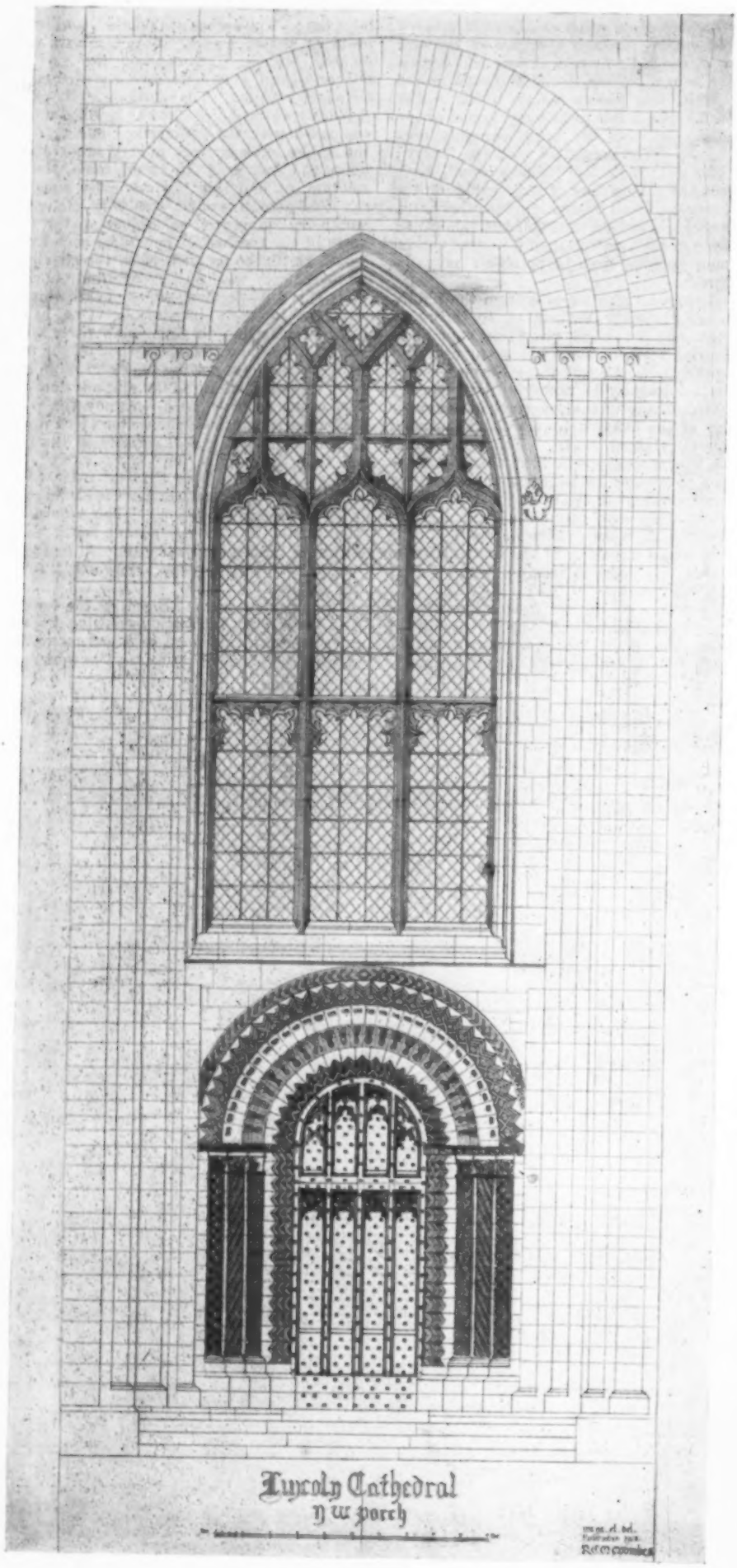
The lower arcade still appears in the façade to this day. The one immediately above, although removed from the west front, appears on the north and south, and in the barrel vaulted passage mentioned below. Their return along the breaks at the north and south corners, although hidden by the screen, can be found in the barrel-vaulted passage marked "K" on the section.

The openings in the recesses on the west front and south side, although appearing hopelessly out of centre, are central with the compartment internally. Their presence on the west front is



Lincoln Cathedral: Details.

only conjecture, but warranted by the presence of one on the south side, high up, in what is now called the Ringer's Chapel. This is blocked up, but upon close examination dimensions were taken with reasonable accuracy. It will be noted that the Gothic counterpart is also externally out of centre. (See detail of north-west doorway, *p.* 482.)



Lincoln Cathedral: The North-West Porch.

The north and south elevations require no conjectural reconstruction; all the Norman features can be found still in existence, although the lower portions are hidden in erstwhile inaccessible passages and crevices. The towers and gables are, of course, visible externally; the latter extend as shown on the measured detail drawing of the north gable (*p.* 489).

The broken blocks of sculptured frieze, which appear over the two apsidal niches, have been purposely omitted. At first sight, their battered condition and rough carving almost places them as very early Saxon work, but their origin, according to experts, took place in the twelfth century. They vary in age and excellence, and apparently are in no sort of order; for instance, Daniel in the Lion's Den has been thrust between the Building and the Sailing of the Ark. This alone, I think, debars them from appearing in the original design, and rules them as later additions.

"Half Church of God, half Castle 'gainst the Scot"—such were the words of Scott in his lines on Durham Cathedral, and so well might Lincoln be described. It certainly must have had a most castle-like and awe-inspiring effect upon the people. Remove the work of Alexander, and how much more terrible and severe must the Church of Remigius have appeared. Its gigantic massiveness of construction; its severe abnegation of ornaments; its hard precise lines; sharp edges of the arches unrelieved by mouldings or even chamfer, its capitals mere blocks; it certainly was a castle. Moreover, in the middle recess, between the second and third arch ring, there is a deep groove recalling the portcullis opening in a castle gateway. This is, in length, of the full width of the arch and about a foot wide, and carried up to the floor of the gallery above, where it is covered with movable flagstones, thus forming a kind of gap through which "boiling oil, lead, or something humorous" might be precipitated on to the heads of any marauders below.

In conclusion, therefore, we may say that the whole conception of the original building was that of sanctuary and fortress, and as such it remained during its early history, but the gradual development of civilisation and love of the artistic have evolved out of this "church-castle" a monument of exquisite beauty, and a queen among cathedrals.

MEETINGS

FRIDAY, *September* 24.

The Institution of Fuel Economy Engineers.—Dr. A. E. Dunstan on "Liquid Fuels." At 18, John-street, W.C.2. 6 p.m.

SATURDAY, *September* 25.

British Confederation of Art.—Garden meeting at Percy Lodge, Christchurch-road, East Sheen, S.W.14. 4 p.m.

Institution of Structural Engineers (Lancashire and Cheshire Branch).—Visit to the Lister-drive Power Station, and the new tram works at Edge-lane, Liverpool.

Lectures on the History of Architecture.

The University Extension Board of the University of London have arranged for the coming session a number of courses of lectures on History, Literature, Art, Architecture, Geography, Economics, &c., to be delivered in various parts of London and the suburbs. Amongst these is a fully illustrated course on "The History of Architecture (Part 1, Ancient)," to be given by Sir Banister Fletcher, V.-P. R.I.B.A., at the Central School of Arts and Crafts, Southampton-row, on Wednesday evenings, at 6 p.m., beginning on September 29. The first lecture is free. The subject will be treated in a popular and non-technical way, and the course will be equally suitable for the professional as well as the non-professional student. The lecturer will trace the evolution of architecture in Egypt, Assyria, Greece, Rome, and Byzantium, with special emphasis on its influence on all subsequent styles, down to our own day.

CONSTRUCTIONAL STEELWORK SIMPLY EXPLAINED.—III

By OSCAR FABER, O.B.E., D.Sc., M.Inst.C.E., etc.

[EDITORIAL NOTE.—*This series, which will be published in book form later, is intended to present the problem in so simple a form as to be readily understood by those having no special engineering training.*]

We still have to consider the three remaining contingencies which the margin provided by the factor of safety is intended to cover.

(11) *Bad Workmanship.*—When the writer first had to do with constructional steelwork in London it was the practice of more than half the steelwork firms to cut the steel joists and plates forming a length of stanchion, drill and rivet them together, and supply this to the job for erection without further effort. The consequence was that it was not an uncommon thing to find the end of a stanchion presenting the appearance somewhat as shown in Fig. 4A, where the various plates and the joists would project beyond one another to varying extent. The upper end of the lower stanchion on which this would rest would present a somewhat similar appearance, and it would be entirely a matter of chance if there was any concordance between these irregular projections.

The net result would be that instead of the stanchion bearing uniformly over the whole cross-sectional area as was assumed in the calculations, it would be much more likely that bearing would take place to the extent of only one plate on each flange, which might represent perhaps one-quarter of the total cross-sectional area, or four times the stress allowed in the design.

It is true that the projecting plate, which really carries the load at the joint, would yield and shorten much more than the others, and might in certain cases do so sufficiently to bring some of the other plates into contact, but this relative movement could only take place if a partial shearing of rivets accompanied it, and it also involved a considerable yield or shortening of stanchions, which would only take place as the full load was approached. This would frequently mean that in a building of ten stories, for example, the joints near the bottom would begin to shorten up as the brick and stonework was approaching the roof, and the writer knows of many cases where fracture of stonework was directly due to this cause.

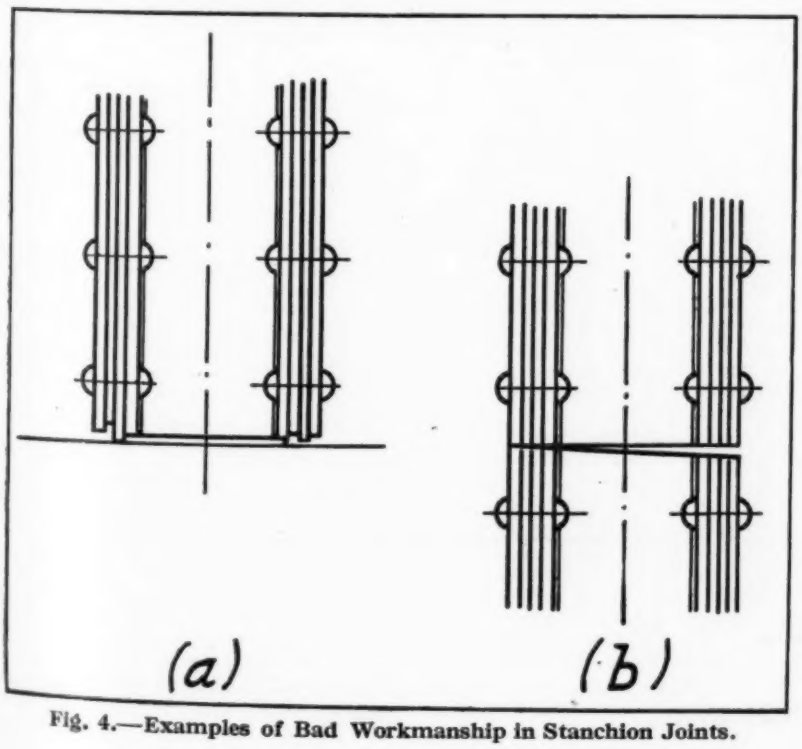


Fig. 4.—Examples of Bad Workmanship in Stanchion Joints.

Needless to say, the writer would not allow this class of work, and fortunately there is now no constructional steelworks in London of any reputation which does not, as a matter of ordinary routine, machine the ends of the stanchions after the joists and plates have been riveted together, so as to produce a perfectly flat face. This is generally done either in a large lathe or in a special machine (called an ending machine), consisting essentially of a large revolving plate provided with cutting tools in the form of knives, against which the end of the stanchion is gradually brought up. Even with this precaution, the possibility of bad workmanship is not eliminated, because the ends of the stanchions, though machine planed, may not be truly at right-angles to the stanchion, so that two lengths when erected may present the appearance shown in Fig. 4B. The writer has had

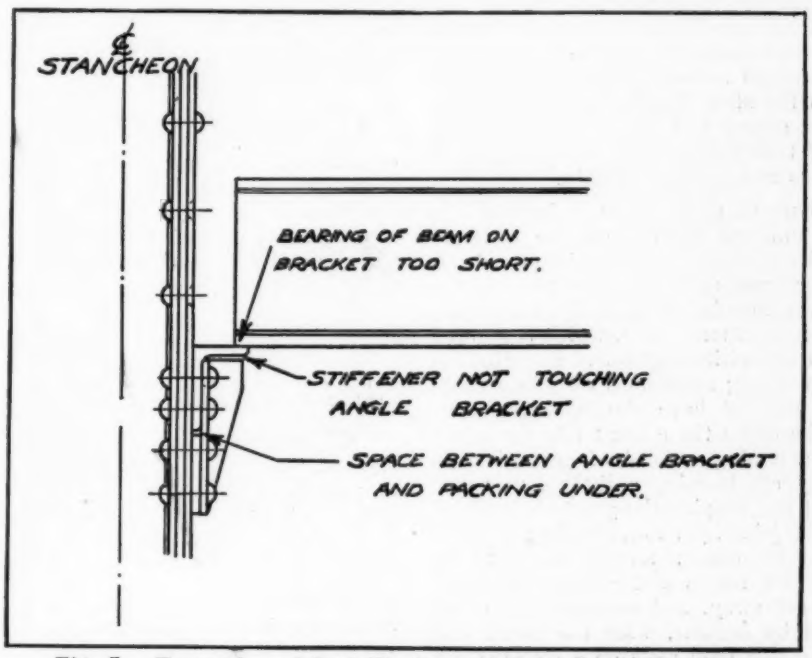

STANCHEON
BEARING OF BEAM ON BRACKET TOO SHORT.
STIFFENER NOT TOUCHING ANGLE BRACKET
SPACE BETWEEN ANGLE BRACKET AND PACKING UNDER.

Fig. 5.—Examples of Bad Workmanship in Beam Bearings.

experience of stanchion joints of this kind, where the opening amounted to as much as ¼ in.

It is clear that in these cases, instead of the whole stanchion sharing the load uniformly there will be a grossly excessive concentration of stress on the flange where contact is first made. In cases of this kind the expedient of wedge-shaped packing pieces has been used, and is better than nothing, but certainly will never reduce the stress down to the figure which would be obtained with perfect machining.

Fig. 5 shows a bearing of a beam on a stanchion flange bracket illustrating two faults. The first of these is the intensity of stress in the web of the beam and also in the web of the bracket stiffener owing to the short bearing. In calculating this stress, the width of flange of the beam and of the angle bracket hardly affects the result, as it is the comparatively thin web through which the stress has to be transmitted, and here it will be found that excessive stresses are produced unless a proper bearing is given. This may produce dangerous conditions, and in any case produces a yield which sometimes is responsible for cracking in the other materials of which a building is composed.

The second fault illustrated in this diagram is that the stiffener to the angle bracket does not touch the angle bracket at the top, with the result, again, that deformation and yield must take place when the load is opplied.

A third fault is illustrated in the space between the angle bracket and the steel packing under it. The bracket is connected to the stanchion by four pairs of rivets,

which are intended to share the load equally, but when executed as shown in the drawing the angle bracket would be forced down on to the packing plate under it so as to close up this space before the lower two pairs of rivets took their proper proportion of load. All this yielding and accommodation involves partial shearing of rivets and produces excessive local stresses. These examples could be multiplied almost indefinitely, but perhaps enough has been said to illustrate the point for the time being, and it will be referred to again later.

(12) *Bad Erection.*—It sometimes happens that stanchions are put slightly out of position on their foundations, and are then pulled over by the floor beams at the level of the next floor, these beams being to correct length and governing the distance between the stanchions at this level. The effect is almost the same as in Fig. 4B, showing that bad erection can be just as dangerous as bad workmanship.

The base of a stanchion is intended to receive uniform bearing on the concrete under it. Where reliance is placed on grout the space under the base plate at the top of the foundation is filled with a mixture of cement and water, which is allowed to stand and ultimately sets. Experiments made by lifting stanchions off joints made in this manner have shown that though round the edges the cement fills the whole space (assuming a head of grout is provided by constructing a little dam round the joint and keeping the grout with a head above the joint), yet towards the middle of the joint the cement merely settles to the bottom and leaves water above it which cannot get away, and consequently is not replaced by cement, with the result that the stanchion base rests on a concave surface making contact round the edges and leaving a space which may amount to 1 in. or more near the centre.

Conditions of this kind throw upon the gusset plates more load than they were intended to carry, and also produces on the cement a much greater intensity of pressure than it was designed for. In both cases the result is a considerable over-stressing of materials and a yield and dropping of the stanchion when the load is applied, which may produce cracks in a building not unlike those due to unequal settlement of foundations. This example was specially given because it is one for which the steel contractor may not be responsible.

It may be mentioned in passing that in the writer's practice grouting has for many years been given up entirely and the space under stanchion bases is filled by ramming a stiff mortar mixed up with the minimum of water so that the space is entirely filled with a material which is not subject to appreciable contraction subsequently, and which also has much greater load-carrying capacity. Examples of bad erection could, of course, be multiplied almost indefinitely.

(13) *Corrosion.*—The degree to which steelwork is subject to corrosion varies, of course, tremendously. In the case of roof trusses over railway stations, steelwork exposed in industrial areas containing sulphuric acid, nitric acid and other corrosive elements in the atmosphere, steel exposed in hot, damp climates such as are met in many tropical countries, corrosion may be so rapid that a definite thickness of material is allowed all round as a specific provision for corrosion, and the structure need then not be considered as less strong than as designed until this allowance for corrosion has been exceeded.

Where, however no such allowance is made and this is not ordinarily the custom, then any corrosion has got to be provided for out of the margin allowed for the factor of safety. It is true that on exposed structures much can be done by thorough and frequent painting, but there are some atmospheric conditions in industrial areas where paint is destroyed very rapidly. The writer knows of one case where within the six months' period of maintenance, the whole of the exposed steelwork had thrown off every vestige of paint, though this had received four coats of first-class material put on in the best manner.

In the case of steel frame buildings, the steel is practically always covered, partly as a precaution against fire and, in many cases, so as not to shock architectural susceptibilities. In such cases painting is, of course, impossible, at any rate after it has once been covered up. If the steel is really thoroughly protected with two inches of really watertight and airtight cement mortar or concrete the precaution against corrosion will generally be entirely adequate for as many years as are generally contemplated in modern building work. But the writer knows of many cases where a steel frame structure has had brickwork built hard up against the steel. Remembering that ordinary stock brickwork contains about 30 per cent. of voids allowing passage of water and air to the steel it will be realised that under these conditions something serious is going to happen in a small number of years. In the writer's view it is no good under these circumstances relying on paint on the steelwork because paint is rapidly destroyed by cement mortar and lime, the linseed oil being saponified by the alkalies.

In the writer's view much more serious attention to the question of corrosion of steelwork in steel frame buildings should be given than is generally done, and the future will present interesting problems in the case of those buildings where these questions have been allowed to look after themselves. When this time comes it will, at any rate, be some small satisfaction to know that the margin provided by the factor of safety will allow of a certain degree of corrosion before the structure is definitely rendered unsafe.

CORRESPONDENCE

[While we are glad to publish letters on professional and other matters of interest to our readers, it must be understood that we do not necessarily endorse the remarks of correspondents, who will oblige us if they will express their views as briefly as possible.]

The High Cost of Building.

SIR,—I think the answer to the first part of "Builder's" letter in your issue of the 17th inst. is quite obvious. Until the contract is signed the architect has no assurance that the job is going on. Consequently he gets to this point with a minimum amount of labour (few architects get their full scale of charges for abandoned jobs—if they are wise!). When the contract is signed and the time has come—theoretically—to give to the builder every detail and every measurement, it is found naturally that they are not done; as things are, the chances are at least even that they would have been waste labour.

The best having happened and the contract having been signed, the architect heaves a sigh of relief, computes the ultimate income from this particular bit of work, and wonders whether it will at last run to a cheap car. He then proceeds to fish for other jobs. The details for the poor builder can be got on with as a matter of routine. "That job's safe, anyway!" I am very sorry, but it would seem that this is how it works.

The only remedy I can see is for the State to subsidise every architect and make up his income to £2,000 per annum, say, then the whole job could be cut and thoroughly dried before the contract was let—and it would not matter if it paid or not—every detail designed, traced and printed and every detail measurement computed; all that remained would be a series of walks to the job on fine autumn mornings, or when one's partner was more than usually tiresome (a great source of extra supervision, this!).

"Builder" must not blame the architect; he must blame the building owner, who simply will not say, "Go ahead, I will build exactly to your design; never mind what it costs, and you can start to build whenever it suits you!" That is the only building owner who will ever make possible the ideal that "Builder" yearns for—and as far as I know he does not exist. T.

SIR,—Your correspondent, "Builder," has made a good point. If architects as a rule behaved in the way he indicates, and if there were no remedy, the lot of the contractor would be hard indeed. That some architects act selfishly and use their great powers tyrannically admits of no doubt; but they must be a very small minority, while the number of those who expect their work to be carried out "without a specification and with few details" must be smaller still. The contractor has a right to reasonable treatment, and against unreasonable treatment the ordinary contract gives protection. The trouble is that no sensible builder wishes to push things so far as to quarrel with the architect and in so doing earn perhaps an undeserved and undesirable reputation. He will rather grin and bear the hardship and, profiting by experience, avoid that architect in the future. Delays and uncertainties on the part of architect and building owner do disorganise a builder's plans and demoralise his people to an extent which no legal remedy can fully satisfy. The architect, without doing anything legally unreasonable, may mar the organisation of a job and rob the builder of his due profit. It is not only the builder and the workman who must answer sometimes for the high cost of building. J. E. DROWER.

Clearing Away Slums: Housing Act, Section 46.

SIR,—A grievance of property owners and shopkeepers is that they are being illegally robbed by administrative legislation displacing Parliamentary legislation. If an Act of Parliament, framed to deal exclusively with broken-down, deserted and derelict buildings—to take over buildings of no value and paying no value for them—can be applied to stable houses, inhabited and well cared-for, and we can confiscate any property whatever by alleging simple affirmations of housing officials that such healthy houses and streets are not really up to our most extreme fashion in current ideals of what is fit for human occupation, what obstacle is there to pulling down half London and remoulding it to our hearts' desire?

The miracle is that up to the present no owner or leaseholder or combination or trade union of such has invoked the opinion of the Courts of Justice on this administrative law and order! WM. CATMUR.

SIR,—Mr. E. M. Goldring's letter in your issue for Sept. 10, suggests that in my letter in your issue of the 3rd inst., I proposed that owners of slum properties should sell out to (I suppose, unsophisticated) people who might not be aware of the statutory depreciation of slum properties. Such was not my proposal; a careful perusal of my letter will show how I am against people owning such buildings, whether they buy them or inherit them or have them in any way. I stated there was *no value* in such properties, except the land for re-use on proper lines. I stated that it is unwise to *hold* such property, meaning that it would be wise to *give up* or part with slum houses to the public authority for demolition purposes. F. T.

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ILLUSTRATIONS

Lincoln Cathedral.

The drawings reproduced on pages 488 and 489 should be studied in conjunction with the article by Mr. R. E. M. Coombes, beginning on page 480.

House at Ightham, Kent.

This house has recently been built on a magnificent site near to the picturesque village of Ightham. The walls are of brick obtained from a number of yards, and thus vary widely in colour and texture; the roofs are of old country tiles. The general contractors were Edward Punnett & Sons, Ltd., Tonbridge, and the following were the sub-contractors:—Central heating installation, Abbey Heating Co.; metal casements and glazing, George Wragge, Ltd.; grates, fireplaces, &c., Wilmers, Froys, Bowman Bros., and Elsleys; electric light, power and refrigerator, Abbey Heating Co.; sanitary fittings, Pontifex and Doulton; wrought metal work, Cashmore Art Workers; electric-light fittings, Osler & Faraday, Ltd.; old oak panelling, W. Bailey, Kensington.

The whole of the works were under the control of Messrs. Baillie, Scott & Beresford, architects.

Midland Bank, Limited, Belgravia.

This building is now in course of erection from the designs of Messrs. Whinney, Son, & Austen Hall, architects. The general contractors are Messrs. Hall, Beddall & Co., and following is a list of the sub-contractors:—Concrete work: Ground floor and strong room, The Excellence Reinforced Concrete Co.; staircase, Bradford & Co.; upper floors, Caxton Floors, Ltd.; heating, plumbing, sanitary fittings, Stitson White & Co.; lantern lights, The British Challenge Glazing Co.; stone, F. J. Barnes, Ltd.; pavement lights, Haywards, Ltd.; steelwork, Rubery Owen & Co.; strong-room door, Chubb & Sons.

New Royal Infirmary, Doncaster.

The site for the proposed hospital for Doncaster is in Thorne-road, and is approximately 14 acres in extent, having a gentle slope towards the south. The ultimate scheme is designed to accommodate 600 patients with the medical staff and nurses' home, administrative offices, casualty and out-patients' departments, operation theatres, pathological and post-mortem units, central station, and laundry, &c.

Four large ward pavilions, sub-divided into three sections, each providing for 50 patients, with the necessary services, and containing large sun balconies, facing south and west, form the genesis of the plan. The first section, now in course of erection, comprises one triple ward unit, which will accommodate 150 patients, one ward being temporarily arranged as bedrooms for the nursing staff. A temporary goods entrance and stores, main kitchen, nurses' dining-room, minor operation room, and casualty entrance, &c., is provided at the lower ground floor level.

Dr. Donald J. Mackintosh, C.B., M.V.O., as consultant, is associated with the architects Messrs. W. A. Pite, Son & Fairweather, of Westminster. The general contractors are Messrs. Harold Arnold & Son, Ltd., of Doncaster.

Village Hall, Hurst Green, Sussex.

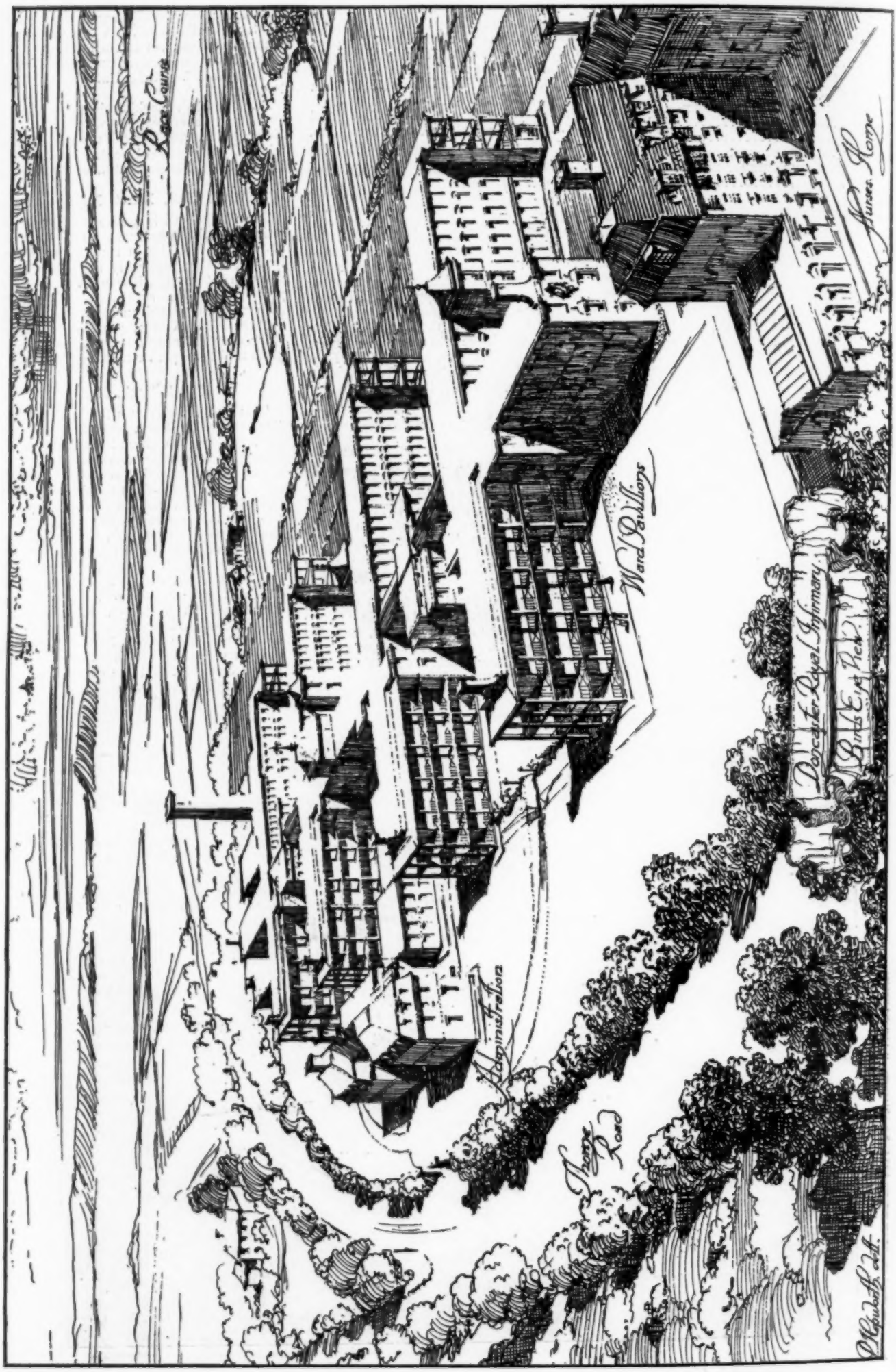
The village hall is a type of building which, owing to the movement to provide better amusement facilities in rural areas, is coming into increasing popularity and one which provides an interesting, if somewhat unambitious, problem for the architect. Mr. W. John Allcorn has designed an attractive little building for Hurst Green, providing a stage and other essential accommodation on a plan that gives a picturesque external composition.

Lloyds Bank, Stratford.

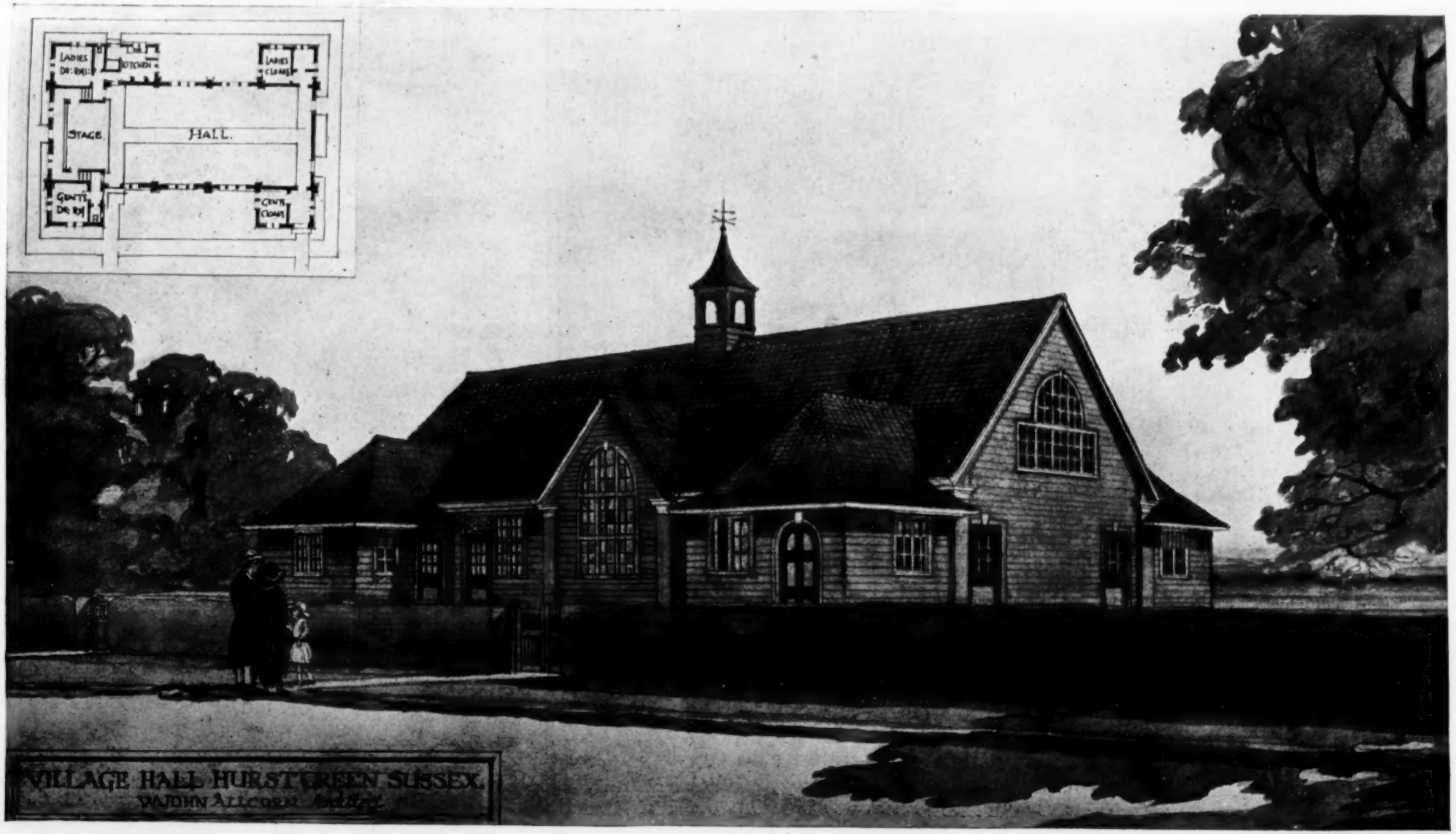
This bank, which was finished last year, in High-street, Stratford, consists of the banking hall, &c., on the ground floor, the first floor being let to an insurance company, and the upper floor containing a flat for the bank's messenger. The facings consist of 2 in. hand-made red bricks, with Portland stone dressings; the entrance doorways are of oak with the fanlight over also of oak, the centre panel in which contains the bank's coat-of-arms in paint and gilt on the oak. The general contractor was Mr. J. E. Whiter, of Newington Butts. Steel windows and lantern lights, by Messrs. C. E. Welstead, Croydon; heating installation by Messrs. Henry Hope & Son, Ltd., of Birmingham; metal lettering by the Birmingham Guild; bank fittings by Messrs. Green & Vardy, and the carved keyblocks by Mr. Joseph Armitage.

Interior of Canadian Pavilion, Cité Universitaire of Paris.

MONS. L. BECHMANN, Architect.

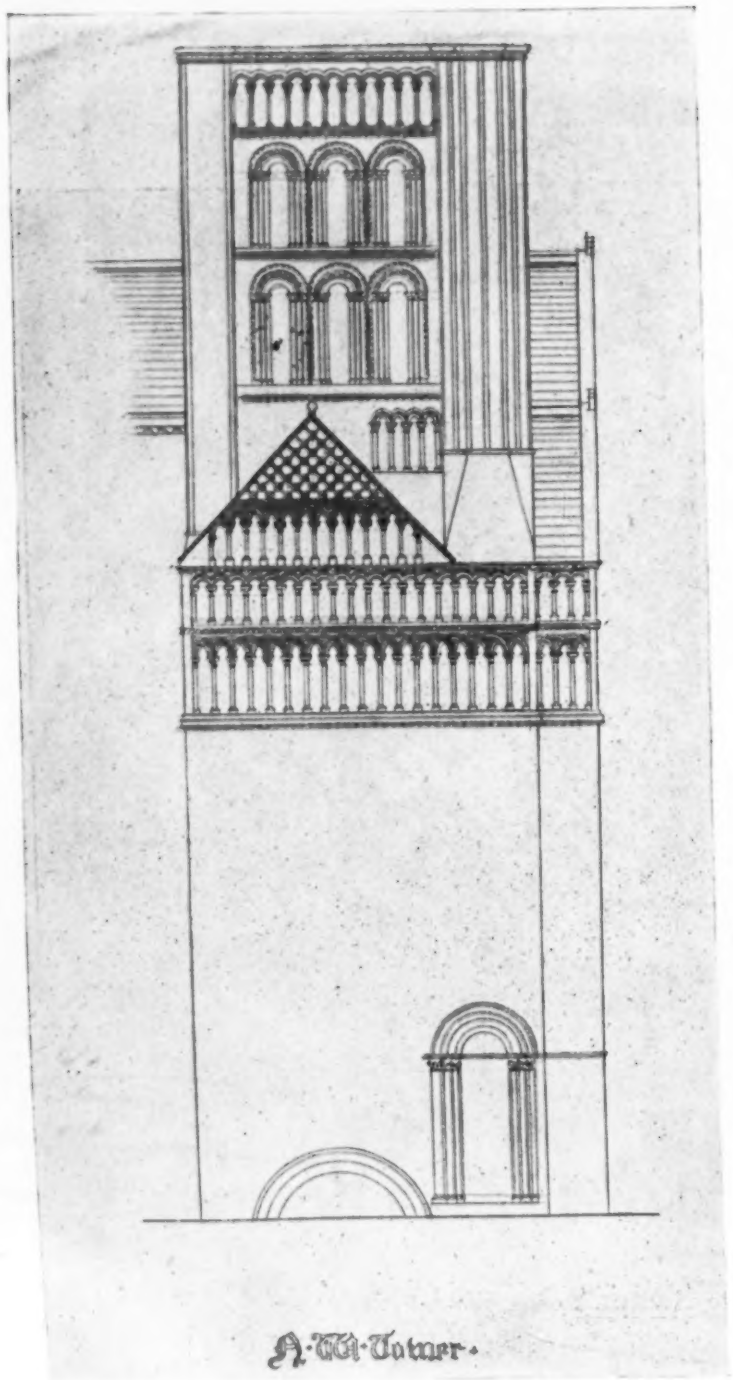


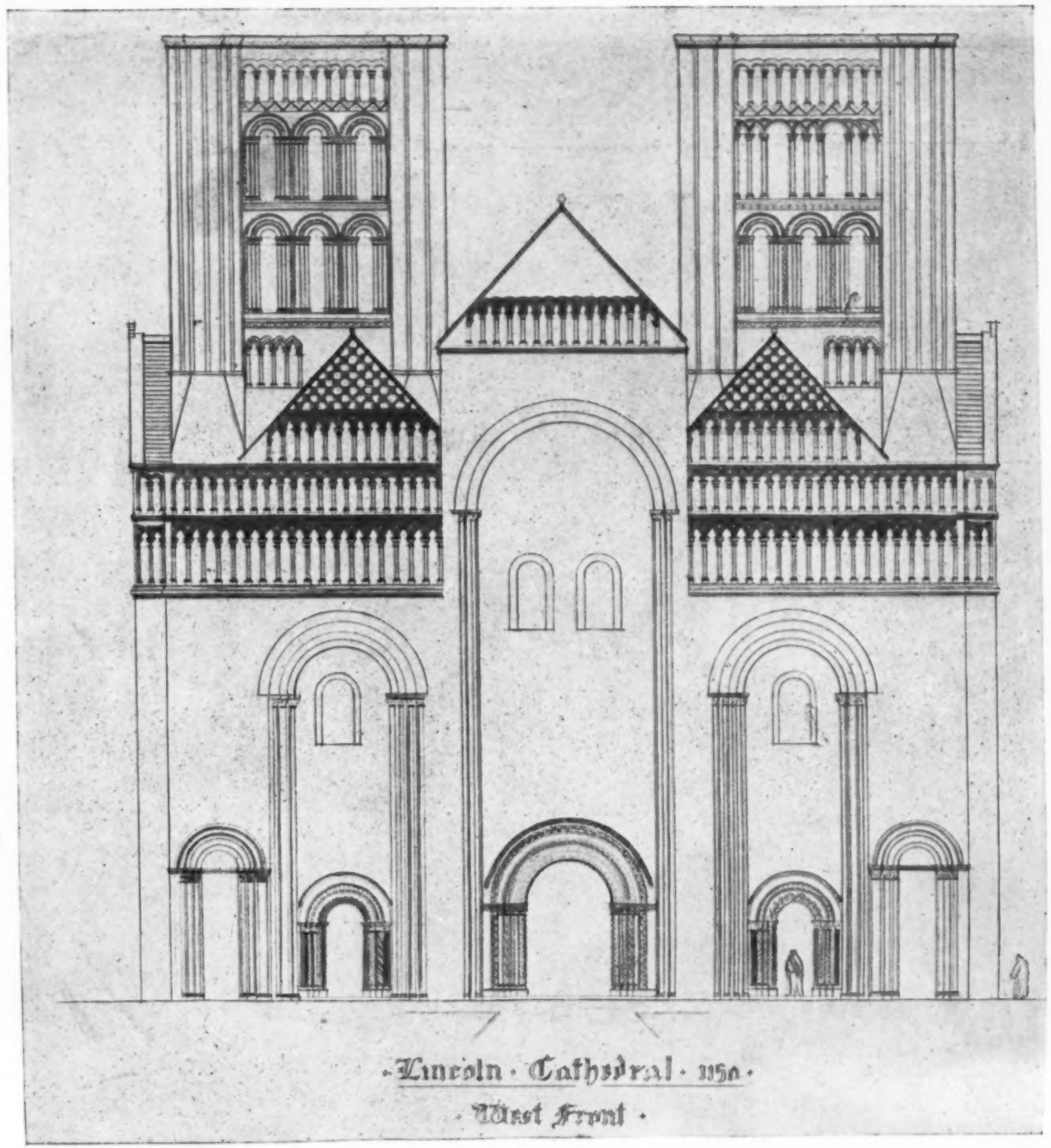
Doncaster Royal Infirmary: A Bird's-eye View.
MESSRS. WILLIAM A. PITE, SONS, & FAIRWEATHER, Architects.



Village Hall, Hurst Green, Sussex.

MR. W. JOHN ALLCORN, Architect.

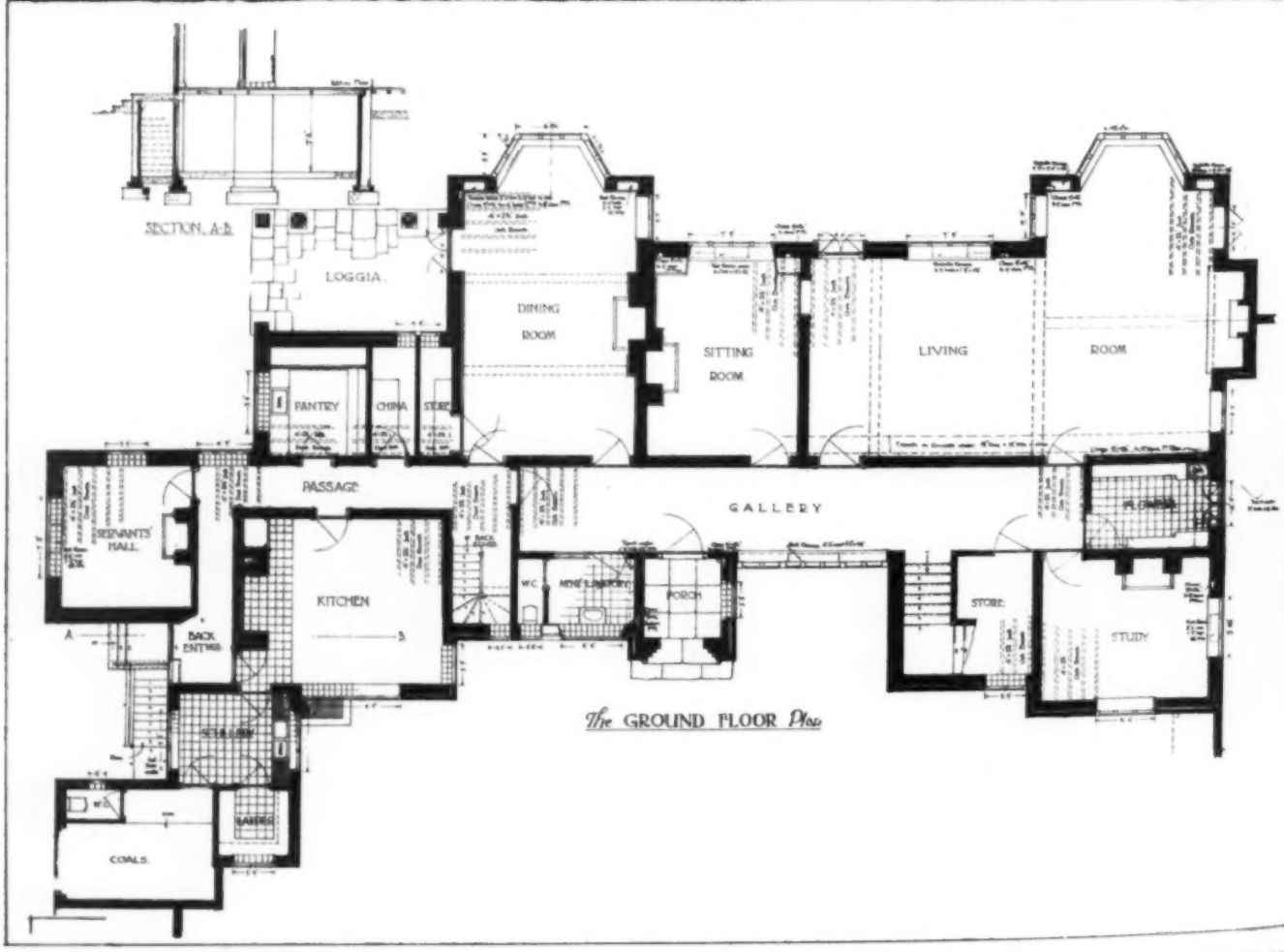




Lincoln Cathedral.

Lincoln Cathedral.

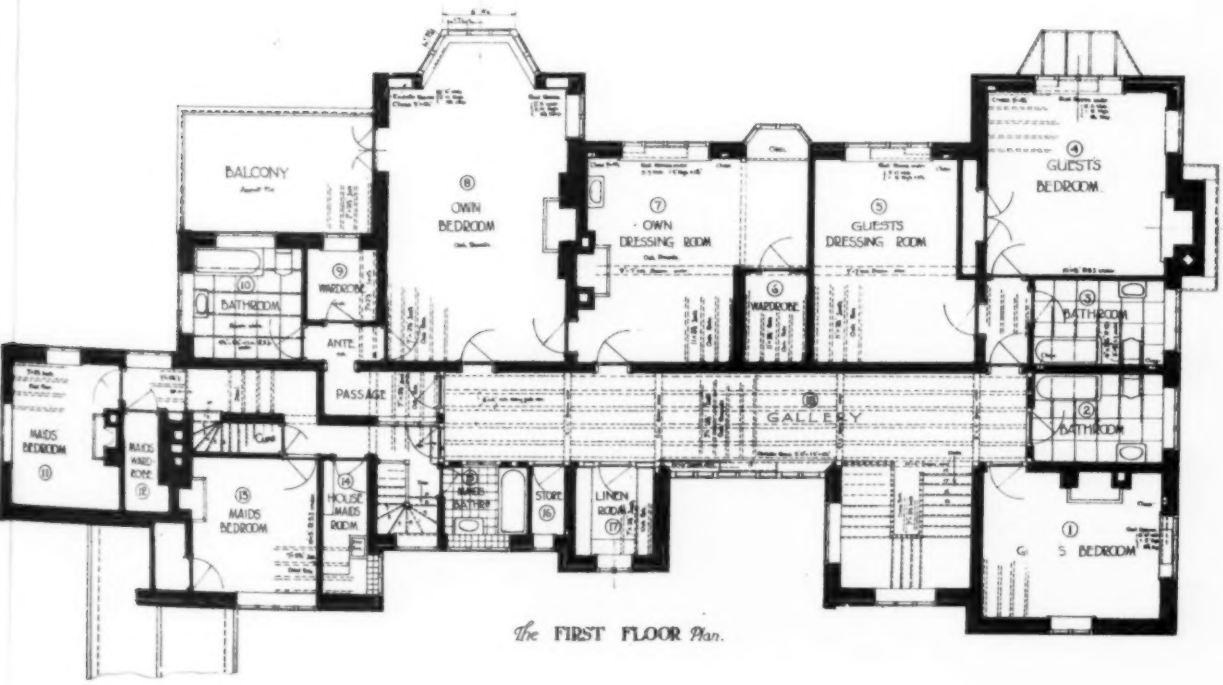
UNIV. OF MICH.



The GROUND FLOOR Plan

HOUSE AT IGHTHAM, KE

Messrs. Baillie Scott & Beresford



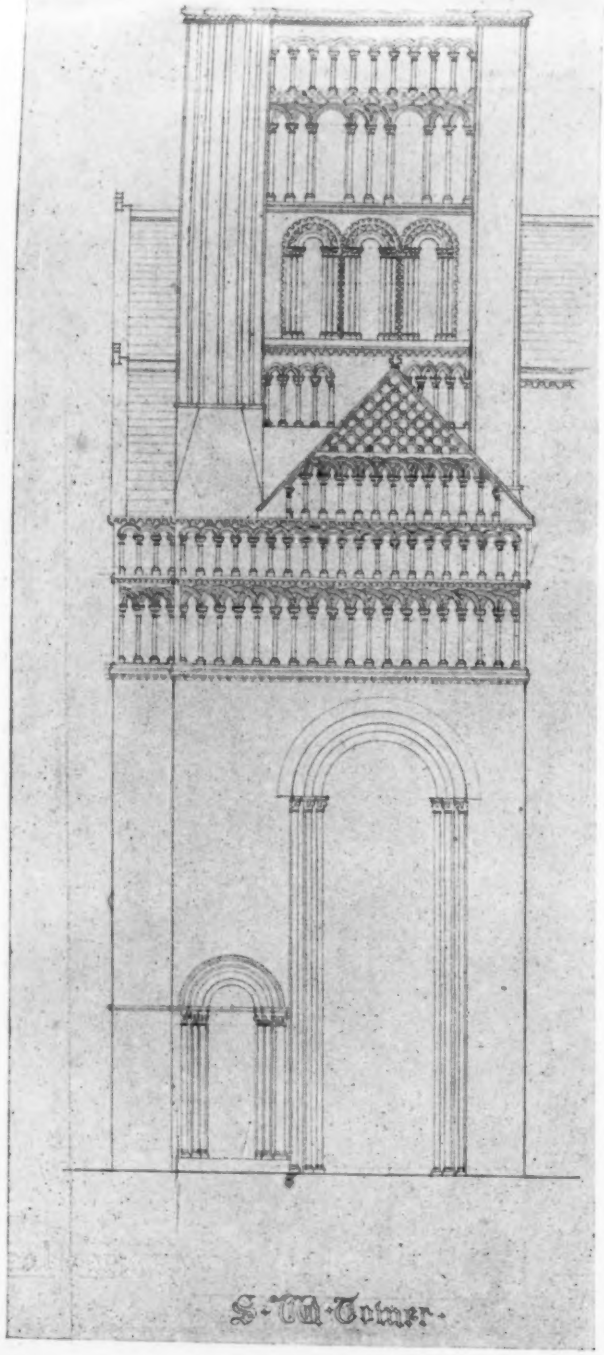
The FIRST FLOOR *Plan.*

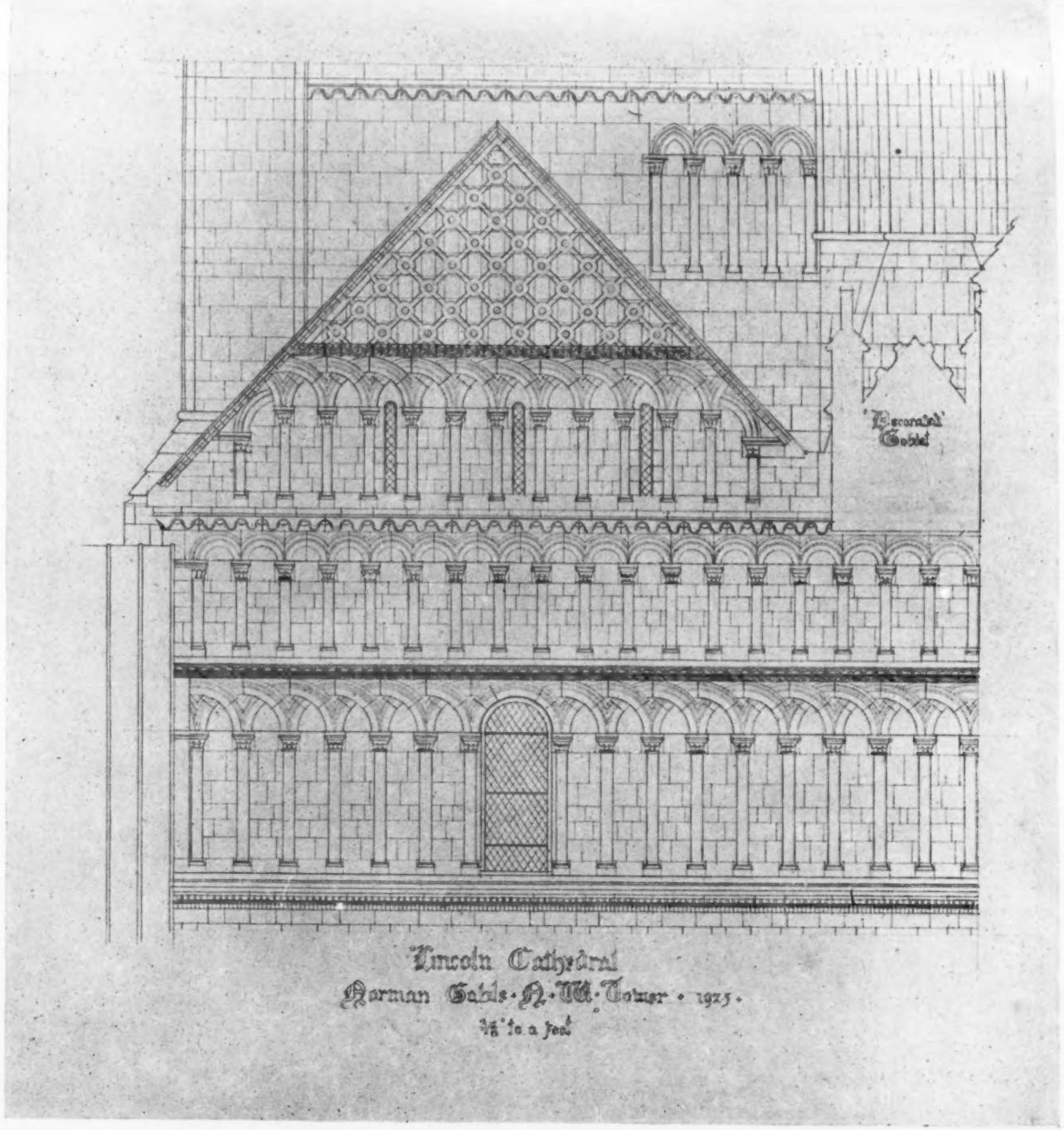
ITHAM, KENT.

& Beresford, Architects.

BELGRAVIA BRANCH OF THE MIDL
Messrs. Whinney, Son & Austen

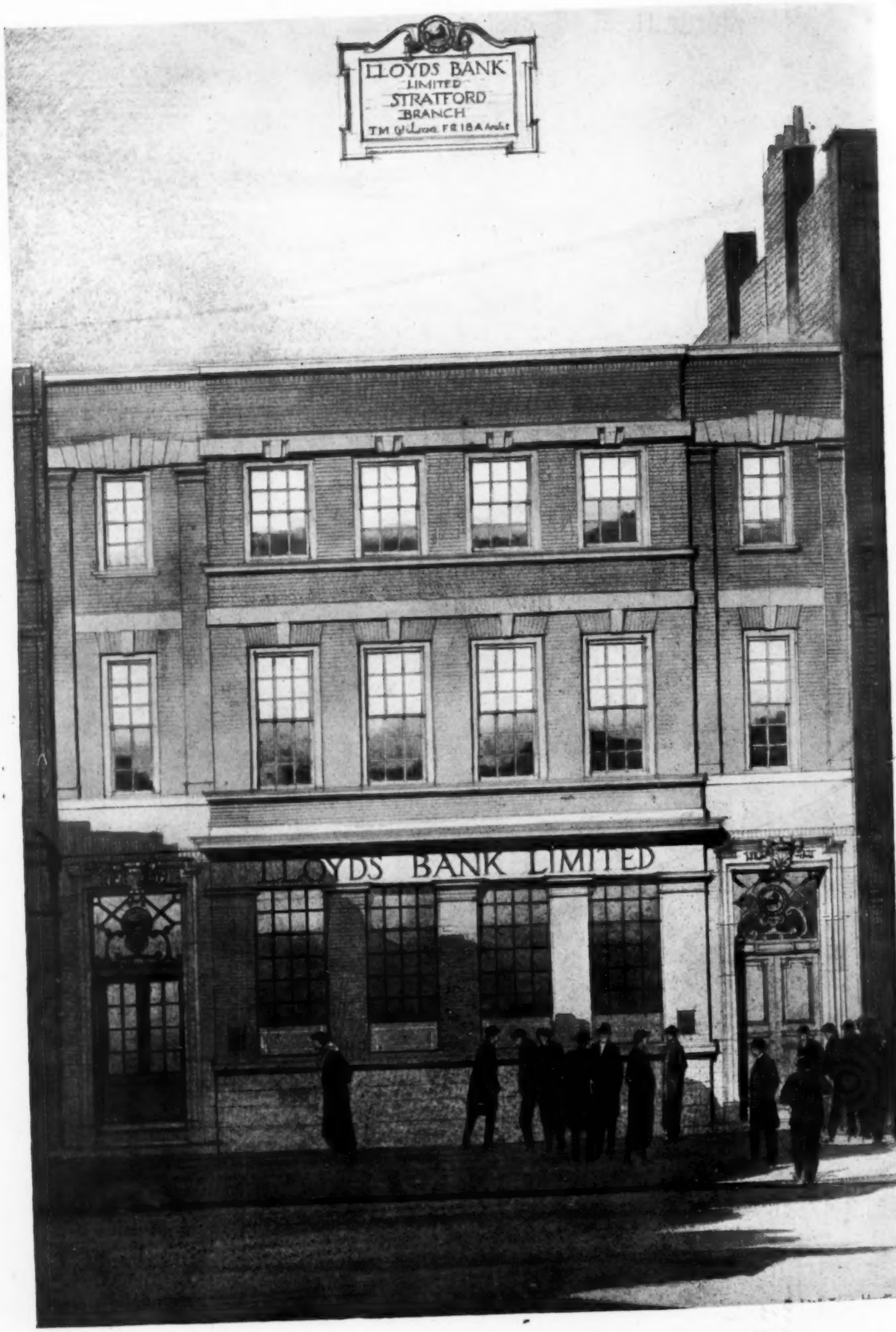
CH OF THE MIDLAND BANK LTD.
Son & Austen Hall, Architects.





Lincoln Cathedral.

Measured and drawn by MR. R. E. M. COOMBES. (*See article beginning on p.* 480.)



Branch of Lloyds Bank, Ltd., Stratford. MR. T. M. WILSON, F.R.I.B.A., Architect.

CONSTRUCTION OF VOLUNTARY HOSPITALS

H.M. STATIONERY OFFICE has lately published a useful little pamphlet, price 2d., entitled "Memorandum on the Construction of Voluntary Hospitals," which is designed to be of assistance to those who may require to consider schemes for the rebuilding or extension of voluntary hospitals. In drawing up plans, it is advanced that consideration should be given to possible future requirements and extensions and not only to the immediate needs. Correctly to appraise the position, early consultation should be made with the local voluntary hospitals committee of the area and possibly through them with the local voluntary hospitals committee of the adjoining areas. The following particulars are applicable to new hospitals, but the principles suggested will be the same in the case of alterations to or extensions of existing hospitals. An important consideration in selecting the position is that the means of access should be good. But accessibility in this connection does not necessarily imply a central position; and it is undesirable to extend or erect hospitals on costly central sites if the balance of advantage is found to lie in the direction of development at the periphery. The final decision will be largely dictated by the type of hospital (*e.g.*, whether primarily for accidents, etc.), but other things being equal in the case of a general hospital, the position will probably be governed by the cost of the site. In the selection of the site, the following considerations must be taken into account:—

(*a*) Area.
(*b*) Accessibility.
(*c*) Elevation and environment.
(*d*) Levels and contour and aspect.
(*e*) Subsoil and surface drainage.
(*f*) Drainage and sewage disposal facilities.
(*g*) Water supply and lighting.
(*h*) The probable developments around the site, *e.g.*, town-planning schemes or any industrial expansion on the adjoining lands.

The area should be sufficient not only for the immediate needs but, as far as possible, for future requirements. In congested districts it may be difficult to obtain an area sufficiently large, but modern facilities for motor transport allow considerable latitude in the choice of the site, provided it is easily accessible from all parts of the area it is intended to serve. The site should command a maximum of sunshine and pleasant outlook and be removed from factories or buildings likely to pollute the air. Protection from northerly and easterly winds is desirable. Low-lying or damp sites should be avoided and, as far as possible, an open site standing above neighbouring buildings should be sought. The levels and contours of the site play an important part in the orientation or aspect of the buildings and have an appreciable effect on the cost of building. A slight fall from north-east to south-west is preferable to any other. The subsoil should be light and porous and careful investigation should be made with a view to avoiding any great expense in the foundations of the buildings or risk of settlement. Facilities for easy drainage into a public sewer should be taken into account as, if no sewer is available, the difficulties and cost of disposing of the sewage on the site must be carefully considered. Wherever possible, the extension of a public sewer will be preferable. An abundant supply of good water is essential and should preferably be obtained from a public source. Usually a supply of electric current from a public source is preferable to and less costly than the generation of electricity on the site. In the same way, a supply of gas from a public source is a great advantage. Roadmaking should be reduced to a minimum consistent with the provision of a suitable approach and the requirements of the hospital. Due regard must be paid to the question of dust; and in this connection the use of tar-mac should be considered.

The general disposition of the buildings will necessarily vary with the shape, size and contour of the site. The wards should be so disposed as to obtain the maximum amount of sunshine and the convenient grouping of patients according to sex and ailment. In order to obtain the maximum amount of sun, pavilions should, if possible, be arranged with their axes approximately north and south. Another important consideration in arranging the wards so that they obtain the maximum amount of sunshine is that this appreciably affects the cost of heating, because the wards where warmth is necessary are on the warm side of the building, while any corridors, etc., can be arranged on the north side. Buildings which would interfere with the lighting of the wards should be arranged on the north side. For economy of service the administrative block and kitchens should be centrally situated and connected with the ward blocks by a covered way. The position of the boiler-house should be selected with the advice of a consulting engineer and so placed as not to be a nuisance to the patients' ward or the staff quarters. If not forming part of the laundry block, it should be within easy reach.

The mortuary should be in some secluded position, preferably near the entrance but not immediately adjoining the porter's lodge. The question, however, of providing a separate entrance or exit to or from the mortuary should be considered in connection with the general lay-out.

The accommodation for patients is best arranged in pavilion form, in order to secure good cross ventilation. Where ward pavilions exceed two stories in height, lifts must be provided; and it is generally undesirable to exceed three stories. When temporary buildings are adopted, they should be of one story. From sixteen to twenty-four beds, arranged in two rows, is the most convenient number for general wards, but, if open-air wards are provided, it is better to have a single row of beds with facilities for removing them to a veranda. At least one small separation ward should be provided in connection with each large ward. Suitable ward kitchens and offices should be arranged to afford ready surveillance over large wards and separation wards where possible. Sanitary annexes with cross-ventilated entrances should be arranged so as to be readily accessible both from the larger and the separation wards and, where necessary, may be duplicated. Sink and sluice rooms are essential. In main wards for adults, a wall space of 8 ft. per bed should be allowed, a floor space of not less than 96 sq. ft. and a cubic space of not less than 1,056 cubic ft. In wards specially designed for children, the wall space should be not less than 7 ft., the floor space 77 sq. ft., and the cubic space 847 cubic ft. In open-air wards having a single row of beds, the wall space should be the same as in main wards. For adults the floor space can be reduced to 88 sq. ft., and the cubic space to 968 cubic ft. For children, the cubic space should not be less than 700 cubic ft. In separation wards, for one bed only 120 sq. ft. of floor space and 1,200 cubic ft. are advisable. For more than one bed, the standards recommended for main wards should apply. The height of the large wards should not be more than 12 ft. nor less than 11 ft., but in the smaller wards a minimum of 10 ft. can be accepted. The operating section should be arranged in a convenient central position with northerly aspect, and should be readily accessible by lifts. Preferably the out-patient department should form a separate block connected by a covered corridor with the receiving and casualty department, and should include the dispensary, and it may include the massage rooms if conveniently planned. Both the dispensary and the massage rooms should be as near as possible to the connecting corridor to the main hospital building.

As already stated, the administrative block should be centrally situated, but the accommodation and general arrangement must necessarily vary with the size and aims of each hospital. In planning the accommodation it is particularly desirable to bear in mind all possible future extensions.

The kitchens and cooking department may be placed on the top of other accommodation so as to secure upward ventilation but, if not, should be in a one-storied building.

In smaller hospitals the nursing and domestic staff will usually be housed in the administrative block, but in larger hospitals the Nurses' Home is best arranged as a separate building, if possible in a quiet and detached position. Provision should be made for one or more clinical laboratories. The laundry building, if one is required, may be combined with the boiler-house in one block. The planning of the laundry will depend on the size of the hospital. The construction of hospital buildings may be in temporary, semi-permanent, or permanent form.

Methods for the treatment of disease have not reached finality, but already the greater use of light and open air, involving verandas and roof wards, is affecting the character of buildings, and the heavy and elaborate treatment sometimes adopted for such buildings is now less appropriate than it ever was. The buildings should be simple in character, inexpensive in treatment, depending for their pleasing effects on good design, proper proportion and appropriate grouping.

GARDEN CITIES & TOWN-PLANNING ASSOCIATION

THIS Association last week-end paid a visit to Leicester, Nottingham, Sheffield and Rotherham. A number of architects and representatives of local authorities attended at the Conference place. On Sunday evening, at Nottingham, a discussion on town planning was opened by Mr. B. S. Townroe, M.A., who said that the question of the preparation of a town-planning scheme for the city of Nottingham was referred by the City Council to a Special Town-Planning Committee, appointed in March, 1923, which convened a conference with representatives of the adjoining authorities and the County Council and invited them to co-operate. The result of the conference was that the twelve adjoining Urban and Rural District Councils agreed to co-operate with the City and a Joint Town-Planning Advisory Committee was set up. This Advisory Committee comprises representatives of the Nottingham City Council and of the adjoining authorities. The Joint Advisory Committee at its first meeting unanimously appointed as its Chairman the Chairman of the Nottingham Town-Planning Committee (Mr. Councillor Crane). The Joint Committee also appointed the Town Clerk of Nottingham (Mr. W. J. Board) their Honorary Secretary, and the City Engineer of Nottingham (Mr. T. Wallis Gordon) their Honorary Surveyor. Each of the authorities within the Regional Area acted as an independent town-planning authority—prepared its own town-planning scheme and carried out its own detail work, subject only to the recommendations made by the Joint Advisory Committee. The Advisory Committee held its meetings at least once a quarter, when the various matters arising out of the town planning of the Regional Area as a whole were discussed and the necessary recommendations made to the various authorities. The Advisory Committee was assisted in its work by a Technical Sub-committee, of which the Honorary Surveyor was Chairman. This Sub-committee comprised all the surveyors of the various authorities and was very ably assisted in its deliberations by the County Surveyor of Notts, Mr. J. Cracroft Haller, M.Inst.C.E. One of the principal features of the Nottingham scheme consisted of the construction of a road 120 ft. wide running in a northerly direction from the River Trent across Wollaton Park (recently purchased by the Corporation from Lord Middleton) through the Basford District to the main Mansfield-road. The portion of this arterial road, which runs through Wollaton Park, was already in course of construction.

SPECIFICATIONS.—XXXV

BY H. V. MILNES EMERSON, A.R.I.B.A.

ELECTRICAL ENGINEER (*continued*).

Item

388. EXTENT OF WORKS.—The work detailed by this specification covers:—

The complete lighting and power wiring, coupling up, &c., including main switches and fuses, distribution boards, conduit and conduit fittings, tumbler switches, 10 amp. rotary snap switch and ceiling roses, watertight bracket fittings, cables, flexible cables, earthing clips, lampholders, lamp shades, shorteners, insulated screw eyes, and everything necessary for the complete installation of electric light as specified hereinafter; also the supply and fixing (or fixing only) of ventilating fan, lamps and special fittings.

389. DRAWING.—Drawing No. . . shows approximately the positions of main switch gear, distribution board, lighting and switch points, all as hereinafter specified, but conduit runs are not shown. A wiring diagram is also included.

The exact positions of all control gear and points, and the runs of conduits will be settled on the site by the architect. The proposed runs of conduits and cables to be marked out for approval by the architect before erection is commenced. At the completion of the works the contractor is to supply to the architect plans showing position of all wiring, switches, fuses and all details necessary.

390. ACCESSORIES SUPPLIED BY CONTRACTOR.—The material supplied by the contractor shall be as detailed in Clause .... The contractor shall submit for approval of the architect such samples of material and drawings as he may require, the samples to remain the property of the architect until the termination of the contract. The material used shall be strictly in accordance with the sample approved, and no other make shall be used without the written approval of the architect.

All materials supplied under this contract shall be of British manufacture unless otherwise approved by the architect, in which case the contractor must furnish details of such materials and their country of origin.

The onus of ensuring that this stipulation is observed by any sub-contractor who may be employed on this work by the contractor, rests with the latter, and the contractor should therefore secure from the sub-contractor concerned all information which may be necessary to meet the requirements of this Clause.

A schedule of the material to be supplied by the contractor is incorporated in this specification, and the contractor must fill in this schedule with the list or pattern numbers and manufacturers' names.

All materials used to be to British Standard Specification wherever applicable.

391. SUPERVISION.—The work will be carried out under the supervision of the architect or by an electrical engineer appointed to represent him.

392. SUPPLY.—The supply will be given by (insert name of supply authority) at a pressure of . . . The contractor must make himself acquainted with the conditions of supply and the latest regulations under which the current is supplied, or

The supply will be given by . . . at a pressure of 200 volts A.C., 50 cycles, single phase.

393. REGULATIONS.—The regulations of the Fire Offices must be observed in every particular, and the rules of the supply authority and the regulations for the electrical equipment of buildings issued by the Institution of Electrical Engineers must be observed in all detail so far as they apply.

394. GENERAL CLAUSES TO BE OBSERVED.—The whole of the wiring, including mains, sub-mains, and circuit wires, shall be enclosed in conduit.

All circuit wires shall be 3/.029 in. V.I.R. cable except where otherwise directed.

The conduit shall be carried on the surface of the walls and ceilings, embedded in surface of walls, &c., or laid over joists or otherwise supported, as directed by the architect.

Each pair of main or sub-main cables shall be enclosed in a separate conduit.

Where the supply is an alternating current (A.C.) all conductors in any one circuit shall be enclosed in one conduit.

No wires shall be drawn in on any circuit until the conduit for that circuit is completed to the satisfaction of the architect.

All flexible conductors to lighting fittings, &c., shall be without exception in sight.

Extra long flexibles shall be run where directed.

Switches shall not be placed behind doors or on the public side of any premises (shops, &c.).

Not more than ten lights or a maximum load of 3 ampères will be allowed on any one lighting circuit.

The following table, which shall be strictly adhered to, gives the sizes of conduit to be used in relation to the number and size of conductors. No conduit under ¾ in. external diameter shall be used. A blank in the table signifies that this size of conductor shall not be used in the size of conduit under which it appears.

Size of Conductor.	External Diameter of Conduit.				
	¾ in.	1 in.	1¼ in.	1½ in.	2 in.
3/·029 in.	4	—	—	—	—
3/·036 in.	4	—	—	—	—
7/·029 in.	3	—	—	—	—
7/·036 in.	2	4	—	—	—

Note.—This table can be enlarged as necessary in accordance with the table previously given.

The conduit shall be efficiently fixed by means of saddles and round-headed screws. The maximum spacing of saddles shall be 4 ft.

Saddles of the "distance" type shall be used where required by the architect.

Conduit shall be kept 6 in. clear of hot water pipes, and 2 in. clear of gas and water mains, bell and telephone circuits.

Where two or more conduits are in one run, multiple saddles and adaptable boxes shall be used, and at junctions where conduit passes through walls, &c., back outlet boxes shall be used.

No elbows, tees, plain or inspection, will be allowed. Inspection boxes shall be used in all cases. The drilling of distribution board for utilising spare ways shall meet the requirements of the architect.

All conduit boxes to which special fittings or wall brackets are attached shall be fixed to ceilings or walls by substantial screws, so that the weight of the fitting is not taken by the conduit.

No stock bends will be allowed. All bends shall be made on site to suit local conditions.

Where conduit enters adaptable boxes and distribution boards, &c., the junction shall be effected by means of a socket, bearing on the outside of the case and secured from the inside by means of a hexagon male brass bush of heavy pattern; the whole shall be screwed up tightly to ensure a sound mechanical connection.

Care shall be taken when installing the conduit to ensure that the enamel is removed from the ends and also from the interior of the fittings to ensure good connection. Ends of conduit shall be reamed and freed from all burrs and sharp edges, and all open ends shall be fitted with metal bushes.

All conduit and conduit fittings together with the casing of all I.C. control gear, and fan motor frame (or other apparatus) shall be electrically and mechanically continuous.

395. CONDUIT AND CONDUIT FITTINGS.—All conduit fittings shall be manufactured in accordance with the requirements of the latest British Standard Specification, and all conduit boxes shall be provided with malleable iron covers.

Adaptable boxes shall be of cast-iron, with cast-iron covers.

All conduit shall be of best welded steel, enamelled and screwed.

All conduit and conduit fittings exposed to weather shall be galvanised.

The fixing screws for all conduit, switch, ceiling rose, plug, adaptable box covers, &c., shall be of brass.

All long screw connectors shall be fitted with back nuts.

396. CASING.—To be of the best American whitewood, well seasoned, double-grooved, with ornamental cover screwed on. To be in mahogany, walnut or other wood where necessary to match existing decorations. Joints to be mitred at corners, bird-mouthed at tees and scarfed in the straight runs.

397. CABLES.—All V.I.R. cables shall be of 2,500 megohm grade manufacture in accordance with the dimensions set forth by the latest British Standard Specification and the latest specifications of the Cable Makers' Association.

Each roll or drum when delivered shall be accompanied by a certificate giving the manufacturer's name, their works order number, the minimum insulation resistance in megohms per mile at 60 deg. F. after 24 hours' immersion in water; and the resistance of the conductor in ohms per mile at 60 deg. F. The certificates shall be detached from the coils or drums in the presence of the architect (or person appointed) before the cable is installed and will be retained by him. The cable manufacturer and the above tests shall be approved by the architect.

398. FLEXIBLES shall be of approved manufacture and in accordance with the standards of the C.M.A. Each coil of flexible shall be accompanied by a similar certificate to that specified in clause 397.

Flexibles shall be composed of conductors of high conductivity plain copper wires, lapped with cotton, insulated with two coats of pure rubber, 20 mils. thick, again lapped with cotton and then braided with glacé cotton.

For lights up to and including 100 watts, flexibles shall be 23/·0076 in.

399. I.C. CONTROL GEAR.—All control gear shall be 660 volts rating and shall be metal cased, designed and manufactured strictly in accordance with the rules of the Institution of Electrical Engineers and the Home Office.

The metal cases shall be fitted with solid doors and external fixing lugs, and the whole shall be protected from corrosion in an approved manner. Ample space shall be allowed in the cases for wiring and all dividing fillets shall be of non-warping fireproof material.

Fuses for all control gear shall be of the hand shield (H.O.) type, with all live metal parts effectually shielded.

Combined switch and fuses.—Switch shall be of the "quick break" or "quick make and quick break" pattern. Blades shall be of best hard-drawn copper of ample proportions and shall be dead when the switch is open.

The lid of case shall be mechanically interlocked with the operating handle. The "On" and "Off" positions shall be definitely indicated.

Temperature limits and tests for switch shall be in accordance with the latest British Standard Specification.

Fuse board shall be of the D.P. type, with each bank of fuses mounted on insulated supports. Bus-bars shall be of heavy section high conductivity copper, with cable sockets of ample proportions secured by means of lock-nuts.

HEATING AND VENTILATION

"NEW IDEAS ON CENTRAL HEATING"

UNDER this title an instructive booklet has just been issued at the price of one shilling, by the Copper and Brass Extended Uses Council, with whose permission we reproduce the accompanying illustrations. Central heating is the cure for many domestic troubles, yet it is strange to find that although this system is largely used on the Continent, in America, and in the Dominions, it has not received the attention in this country that it merits. In essentials the system replaces all the fires in the house by one central slow-combustion furnace, situated in the basement or in an outhouse, and capable of being kept in day and night with the minimum of skill and attention, while maintaining the entire house at an even temperature of 60 deg. or more. It has been conclusively shown, says the booklet, that most of the smoke and gloom of our cities and large towns come from the wasteful and unscientific use of coal in our domestic grates, and even if the other advantages to our comfort and pocket did not exist, to replace the many smoke-producing fires by one smokeless coke furnace would be very well worth doing. Many would go so far as to name it a social duty, as, if central heating were universally adopted, it would go very far towards solving the smoke problem.

The actual way in which the single fire will be adapted to the triple service of heating, supplying hot water and cooking, will depend upon the special circumstances and requirements of the individual case. A typical example for a house of medium size is worked out as illustrated in Fig. 1. In this a combination stove supplies radiators on two circuits and a hot water storage calorifier on a third. Mounted on top of the boiler is a well lagged oven for cooking purposes. Stop cocks are arranged in the two heating circuits, which enable these to be shut off during the summer months when heating is not required, leaving the apparatus still available for hot water supply and cooking. The average English winter consumption should cost in the region of 1s. per day. A strong objection to central heating from the householder's view point has always been the disfigurement to the house entailed by the laying of large iron pipes and the presence of immense radiators. The architect in turn was confronted with the necessity of maintaining correct levels and the consequent difficulty of, say, taking a pipe across a door or passage. All these difficulties can now be overcome by the use of small-bore thin-walled copper tubes, combined with some system of forced circulation. There is practically a new technique in central heating. Copper pipes of, say, ½ in. diameter can be run about a house almost as easily as electric light cables and with no more disfigurement than a telephone wire. An additional advantage is the high resistance of copper to corrosion, with its consequent long life and the absence of harmful products.

The adoption of some positive method of causing the water to circulate is in itself an immense advantage. In flats and bungalows some sort of forced circulation is essential, as there is in these cases not sufficient height available to produce the required head by difference of temperature.

It can be accomplished by inserting in either the common flow or return a small centrifugal pump, very similar to that used in nearly every motor-car to circulate the jacket-cooling water, driven by an electric or other motor, or by a hot-air engine, of all engines the simplest and most fool-proof. It is interesting to note that a patent has recently been taken out for driving the same hot air engine from the waste heat in the flue of its own hot water boiler. The cost of this forced circulation is very small, amounting only to about 2 per cent. of the running costs.

Central heating with copper tubes for circulating the hot water has long been a favoured method of heating large hotels, public institutions and on board ship, where it has proved its complete reliability. It has always been useful for large suites of offices or of flats, and can readily be adopted for working class flats. Workmen's houses built as is now the fashion, in blocks of four or six, can be efficiently heated, the whole block from one fire in an outhouse serving the lot. An adjustment in rent could be made in return for the duty of "firing-up" for the block. The hot water for the block could with advantage be supplied from the same fire. An incidental advantage of the system is that in exceptional seasons, such as we occasionally experience, the apparatus can readily be reversed and used as a cooling installation by the circulation of cooled instead of hot water. This has recently been done in the new Bush House building in London, resulting in the lowering of the temperature inside the building by as much as 12 deg.

The cost of the installation is an important matter. In the case of the small semi-detached house already referred to, illustrated in Fig. 1, costing from £1,200 to £1,500, containing hall, two reception rooms, kitchen, scullery and four bedrooms, the materials required for giving an equipment for central heating, cooking and hot water supply consist of a combination boiler, oven and hot plate installed in the kitchen, and radiators totalling 200 sq. ft. distributed in the various rooms, with a storage calorifier to supply hot water to the bathroom and scullery, together with the necessary interconnecting pipework. It is a central heating and a hot water service in one. It can serve for winter or summer. With the pipework carried out in light gauge copper tube, but with no reduction of bore and no accelerated circulation, and using compression joints, the cost totals £173 17s. 10d. The same job, carried out with the hot water pipes in lead and the circulation pipes to the radiators in wrought iron, everything else remaining the same, works out to a total of £165 5s. 2d. It is thus seen that the extra cost of carrying out the installation in copper, even with the pipes of the same diameter, is really very trifling, and gives for this small extra expenditure all the advantages of permanence and of no corrosion, obtainable by the use of this material. Here is the cost of a central heating scheme for the house illustrated in Fig. 2, and containing hall, three or four reception rooms, kitchen, servants' sitting room and five or six bedrooms, and costing, say, £3,000 to £4,000. In this there is provided 500 sq. ft. of radiator surface. This is a central heating service only, and the hot water for washing, &c., is quite distinct. It could, of course, have been obtained from the one fire, if desired.

In the first place the cost is worked out for a central heating scheme of the ordinary type, using a hot water boiler and four circuits to the radiators, the circuits consisting of 1½ in. wrought-iron pipes. The final cost is £264 17s. 6d. Secondly, the cost of an equivalent installation on the forced circulation principle, using small bore light gauge copper tubing for the circuits, and also an electrically driven pump for circulating the hot water is worked out in the booklet at £256 8s. 1d. The introduction of small bore light copper tubing gives a positive circulation to all parts of the house, with all the other advantages already referred to, such as freedom from corrosion and consequent blocking up of the pipes, and the minimum of disturbance to the house during its installation.

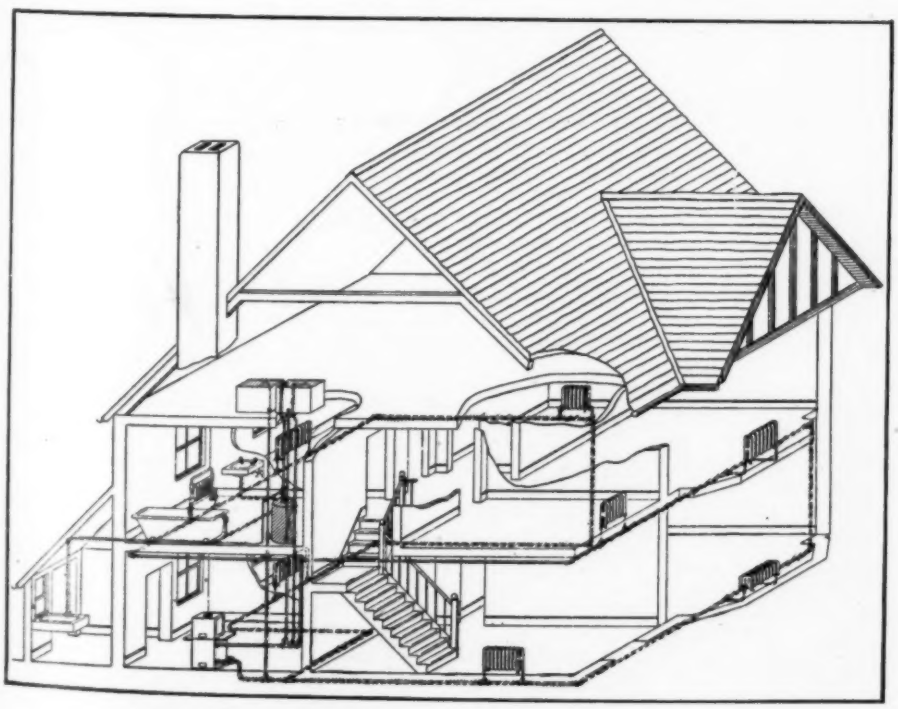


Fig. 1.—Equipment for Central Heating, Cooking, and Hot Water Supply for a Semi-detached House.

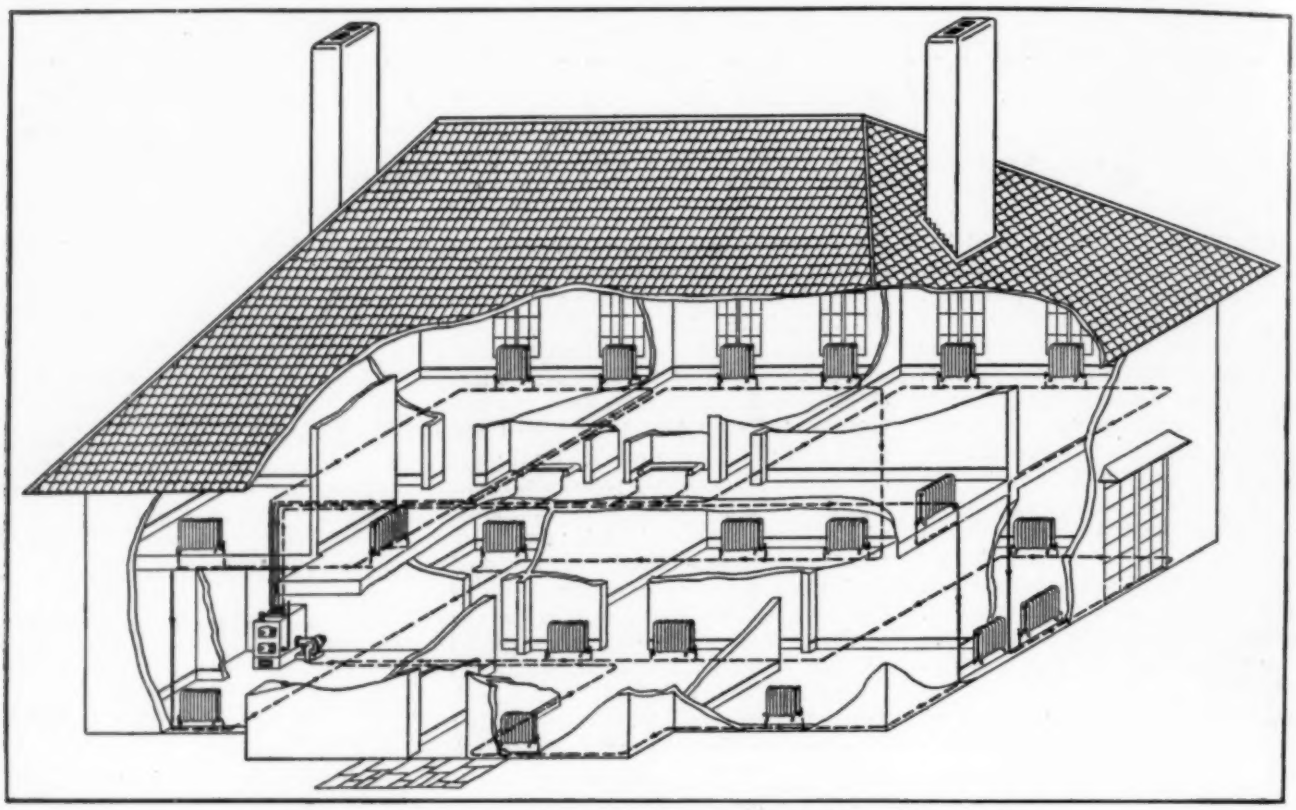


Fig. 2.—Central Heating with Forced Circulation. (*See p.* 493.)

GAS HEATING AND SMOKE ABATEMENT

THE 1926-7 heating season is opening auspiciously for the gas industry, in spite of the troublesome outlook regarding the maintenance of its necessary coal supplies now and in the immediate future. It must be remembered that these troubles are transient and will pass, and they are strongly outweighed by the advantages which the industry has gained—and will increasingly gain—because public attention has once more been sharply drawn to the value of a fuel, the supply of which has always been constant and reliable. The rate of increase in the use of gas for various kinds of heating purposes—amongst which the warming of houses and other premises is one of the most important—had in the past few years already reached almost phenomenal proportions, but events have so shaped themselves this year that the increase already promises to be proportionately larger than ever.

Reasons for the exceptional demand which has already arisen this season for gas fires and heaters are not difficult to find. All the recognised advantages connected with the use of gas for heating purposes have been accentuated by the unfortunate coal strike through which we are passing. It must be remembered that

Fig. 1.—Board Room of the Fourth City Building Society, London Wall, E.C.

MR. GILBERT H. LOVEGROVE, F.R.I.B.A., Architect.

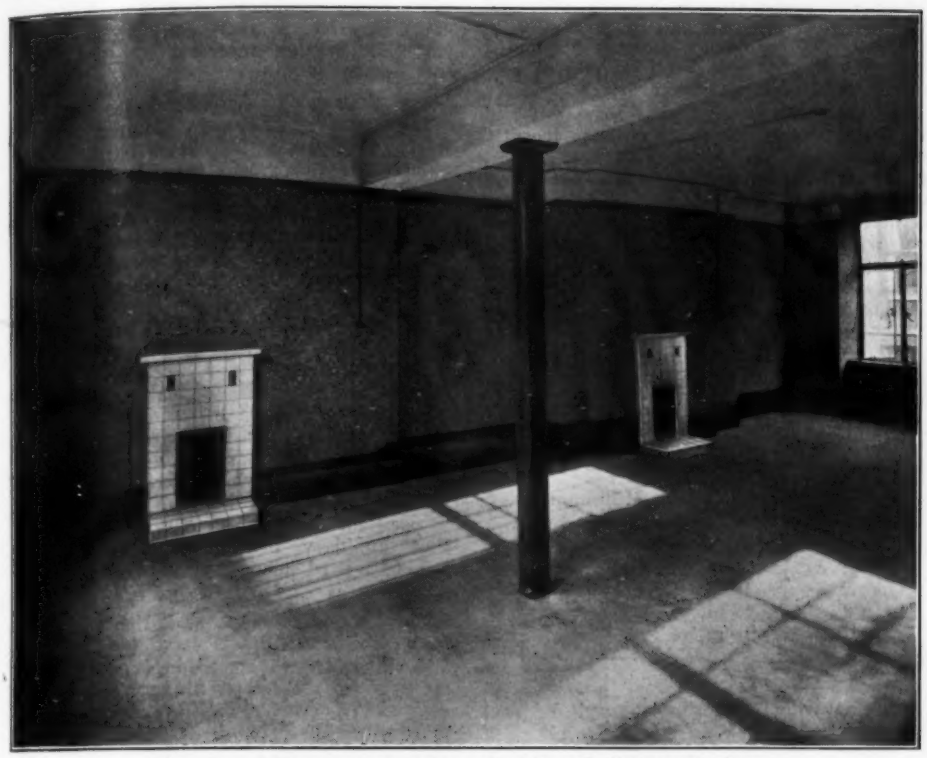


Fig. 2.—Offices of the Fourth City Building Society.

[Grates removed and openings prepared for gas fires.]

seldom or never has the gas industry failed its customers. For instance, the gas supply provided by the Gas Light and Coke Company, London, has never broken down either partially or wholly for more than 100 years, during which extensive period the company has carried on through innumerable coal and other strikes.

It is not to be wondered at, therefore, that harassed factory or office owners, shopkeepers, and the residential public are turning more than ever to the fuel which is constant and reliable, which reaches the point where it is to be consumed without the additional bother of periodical ordering and obtaining delivery to the premises, which requires no storage space and no expenditure of labour to convey it to the various parts of the premises where heat may be required. A gas supply pipe run into the premises and an adequate piping system with satisfactory appliances installed, are all that are necessary for heat to be provided with efficiency and economy by the simple turning of a tap at any moment day or night.

Gas Heating at the Smoke Abatement Exhibition.

The Smoke Abatement Exhibition, which was recently held at Birmingham, with its comprehensive display of smoke-and-labour-saving gas appliances and its instructive lectures by prominent people, has had considerable effect upon the public, which is always seeking for better things from the viewpoints of the saving of labour, hygienic efficiency in the home, and an improvement in the atmosphere of its towns.

The greatest cause of the creation of smoke and the resultant pollution of the atmosphere is undoubtedly the domestic chimney. Dr. Margaret Fishenden—the well-known technological fuel expert—in a paper entitled "The Outlook for Smokeless Domestic Heating," mentioned that "though the domestic consumption of coal was about 40 million tons a year and industrial consumption about 100 millions, there was good reason to believe that the house chimney was the more mischievous." She continued: "If the problem of the domestic fire could be solved satisfactorily, then smokeless cities would become relatively easy." At the Smoke Abatement Exhibition at which the paper was read the gas industry had a number of exhibits of gas appliances of all kinds, which can be claimed to go a great way towards the solution of the domestic chimney problem.

Gas cooking stoves and gas and coke-fired water heaters of all kinds were to be seen illustrating how cooking and water heating can be done with gaseous or smokeless solid fuel. Gas fires and other gas-heating stoves were also to be seen in great variety, including those in the ordinary black finish of plain designs to stand in front of existing coal grates, and others of more artistic appearance in many beautiful finishes to conform with any style of architecture and surroundings. The latter type of gas fire is usually fitted to a prepared tiled or marble opening, or against a similar—or metal—backing which has been made to cover in an existing coal grate. It is worthy of note here that of late years the gas industry has given special attention to the appearance of the fire when it is fixed, realising that it must look part of the scheme of things, and not like an afterthought or a necessary evil.

Gas Fire Flue Construction.

Most prominently to be seen at the Exhibition were special exhibits of the "built-in" types of gas fire, designed entirely to take the place of the coal grate when buildings are constructed, instead of the old wasteful process of first fitting a coal grate and subsequently—mostly at an early date—standing a gas fire in front of it. Such fires were to be seen in great variety of design on several of the stands. One type for bedroom use had a useful boiling burner fitted on a swivel joint, and concealed beneath the front of the fire ready to be pulled out whenever it is required and replaced when finished with.

Probably, however, from the viewpoints of the architect and the builder, the most important item connected with these exhibits was the demonstration of the methods of fixing "built-in" fires, which were clearly set out on the stand of the combined Midland Gas Undertakings. Builders have at times failed to construct satisfactory flues for "built-in" gas fires, but here the correct methods of construction were clearly shown, both in brickwork and concrete blocks. The well-known "Nautilus" flue blocks were being used for the purpose, and also a new type made by Novocrete, Ltd., for which special advantages are claimed.

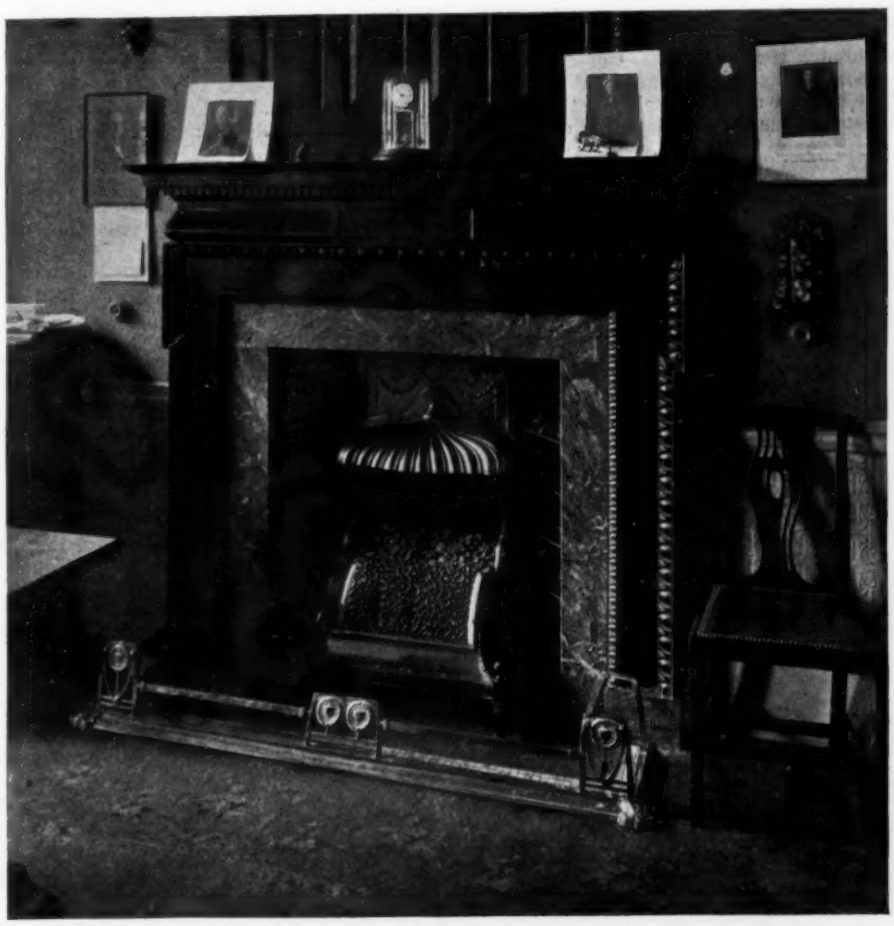


Fig. 3.—Premises of New Health Society, Bedford-square, London: Fire in Secretary's Office.

It is of importance to note that gas undertakings, gas fire manufacturers and concrete block makers, are now prepared to give advice and assistance to those who wish to know the best and cheapest methods of constructing what are known as "economy" flues for gas fires. Descriptive and illustrated matter may now be obtained showing how concrete flue blocks should be laid to bond in with brickwork, and how the fire openings should be made to accommodate the combined gas fire and mantel registers, which are now being sold in tens of thousands, for installation in housing schemes and for private residences and other buildings all over the country.

While on the subject of the proper construction of flues for gas fires, which, while effecting a material saving in building costs, will also act as valuable adjuncts to the ventilation of apartments, it is pertinent to quote an extract from a paper read at Birmingham by Messrs. Raymond Unwin, F.R.I.B.A., and Pointon Taylor, F.R.I.B.A., (Chief Architect and Chief Assistant Architect respectively to the Ministry of Health). Their paper was entitled "Clean Air and Clean Houses," and concluded as follows:—

"The provision of suitable extract flues for the products of combustion of coal fires is a matter fully dealt with under the building by-laws of local authorities. In addition to this purpose, such flues act effectively as extract flues for ventilation purpoces. Ventilation for rooms without fireplaces is also dealt with in most codes by by-laws. The usual requirements in this respect do not, however, provide for the modern gas fire. In the interests of health, it may well be that to require more adequate means of extracting the products of combustion from rooms in which gas burning apparatus is used than are at present compulsory, has become desirable. The use of gas in some cases has been discredited for want of such provision. Whether compulsory or not, an extract flue of adequate area, so arranged as to minimise the danger from down-draught, should be provided to every gas fire; and where this flue provides only for the products of combustion, a second extract flue for ventilation, rather than a mere air grate through the outer wall, would probably give more effective circulation of air. At least, it behoves us to recognise that the value of the smoke flue for ventilation is one of the reasons why people cling to the coal fire; and the question of securing equally good ventilation when gas or electric heating is adopted forms a necessary element in successful propaganda for smoke abatement."

This authoritative statement bears out and strengthens the principles which have recently been expounded and adopted by the gas industry, viz., that a flue shaft is necessary in every habitable room. Those connected with the industry have also continuously published the advice that a gas fire shall always be fitted to a suitably constructed flue of a capacity which is adequate to remove all its products of combustion, plus a sufficient margin to provide a valuable ventilating effect on the room. If this is done, there is no need for an additional ventilating shaft or air grate at all.

With this end in view the gas industry has recommended the adoption of the following minimum areas for gas fire flues:—

Number of Radiants.	Size of Gas Fire Front.	Minimum Flue Areas recommended.
5 & 6	8 in.	20 sq. in.
7 & 8	10 in.	24 sq. in.
9	13 in.	30 sq. in.
10	14 in.	36 sq. in.

There are now three kinds of gas fire installations:—

1. Those which are simply fixed in front of coal grates.

2. Those which are either fixed against special backings which have been fitted in front of coal grates or to suitably prepared openings from which coal grates have been removed, or

3. Combined gas fire mantel registers fitted to specially constructed economy flues by which building costs are reduced and a greater floor space is provided on the same ground area.

The first method has been adopted for many years. There are many hundreds of thousands of fires thus fitted, giving perfect satisfaction and providing a quite pleasing appearance. Whenever the latter is not the case, however, the local gas undertaking will always put forward suggestions for the substitution of a more suitable gas fire or for improving the method of fixing—and thus the appearance of the existing fire. Following, however, are some details of interesting installations which come under headings 2 and 3, and in some cases they include short descriptions of other smokeless heating apparatus installed on the same premises.

The Fourth City Building Society, for their headquarters in London, acquired premises which were about 200 years old, and Mr. Gilbert H. Lovegrove, F.R.I.B.A., was appointed to deal with the adaptation of the building to their requirements. After full consideration of the heating problem, he recommended—and the Society approved—the adoption of gaseous heating throughout the building. This necessitated the removal of some of the old coal grates and the preparation of suitable openings and backings to receive modern gas fires. Fig. 1 illustrates the Board Room from which the original coal grate was taken out, the sides being reset with small red cut bricks. The photograph shows that the gas fire which was installed is quite pleasing in appearance, which effect could not have been obtained with the old coal grate still in position. In passing, it may be mentioned that auxiliary heating is obtained by gas radiators fixed beneath two of the windows.

Fig. 2 is an illustration of interest to architects and builders, as it shows fireplaces from which the grates have been removed, and illustrates the method of preparing the openings for the reception of gas fires. Special note should be taken of the raised hearths, upon which the fires will stand, thus obviating the need for kerbs. As a consequence, also, the radiance from the fire is distributed from a slightly higher position, which system is somewhat favoured by prominent architects. The chairman of the society wrote to the gas undertaking responsible for the installation to express his satisfaction, and mentioned that the saving in the cost of labour in the building equalled £15 per quarter, and that the coal storage space had been released for other purposes, with a rental value of at least £120 per annum, while the total cost for gas consumed in the building during a winter quarter was below £23.

Smokeless Installation for the New Health Society.

The New Health Society—whose founders include many prominent doctors and hygienists—having just acquired new premises at 39, Bedford-square, London, W.C.1, have decided

Fig. 4.—Old Firegrate in one of the Offices.

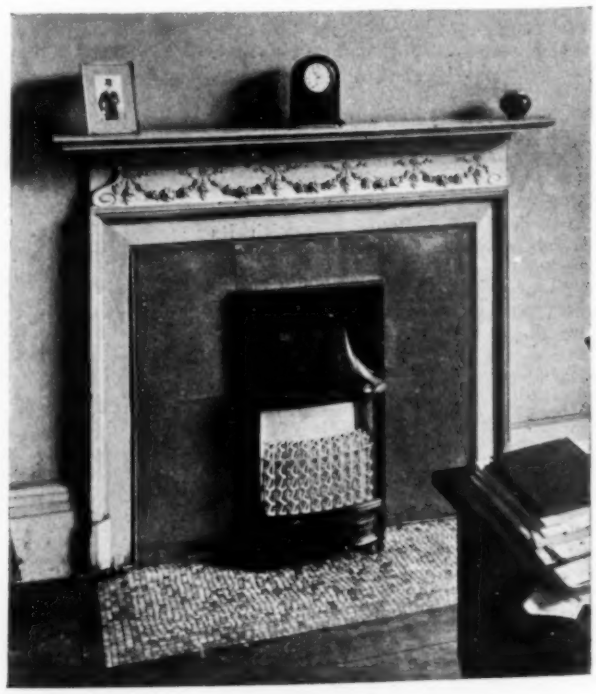


Fig. 5.—Same fireplace with Metal Backing and Gas Fire fitted against it.

Premises of New Health Society, Bedford-square, London.

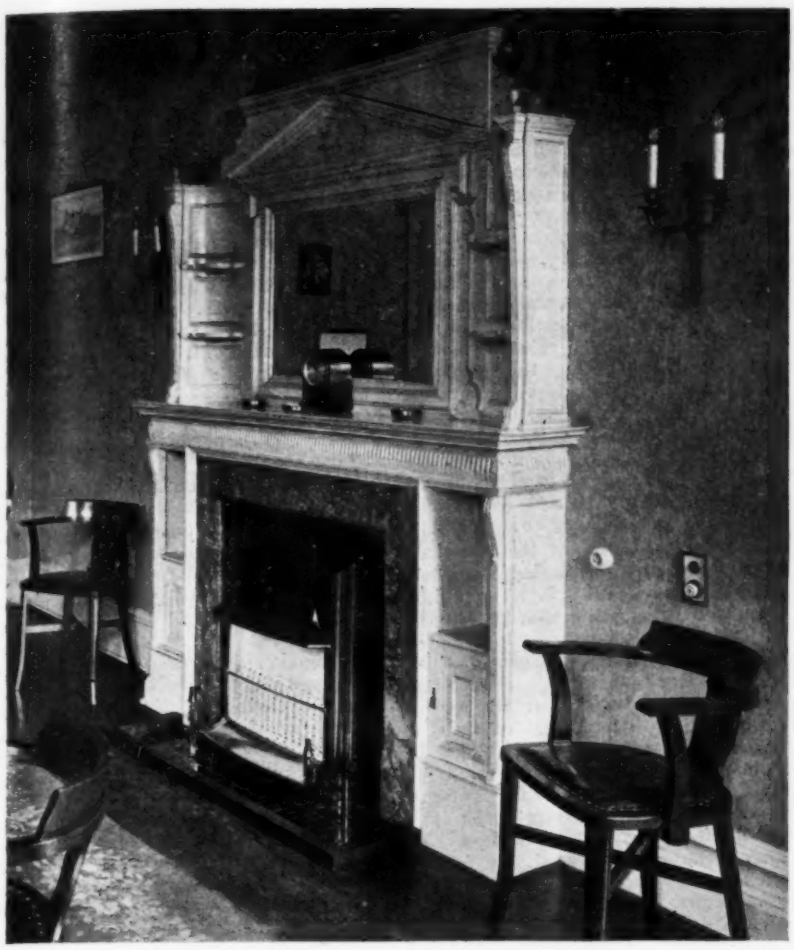


Fig. 6.—Smoke Abatement Society's Offices, Buckingham Palace Gardens: Gas Fire in Board Room.

to put in an entirely smokeless installation for heating, cooking and water heating. Cooking and domestic water heating will be done by gas and central heating by a coke-fired boiler and radiators. Gas fires, however, have been installed in every room as auxiliaries to the hot water radiators when the coke boiler is in use, and as the sole heating agents during the periods—very frequent in this country—when heat is required, but the central heating system is shut down. As the building is an old one, this was another case where, as appearance must necessarily be studied, some of the old coal grates had to be removed or covered in.

Fig. 3 is a photograph of the gas fire which is fitted in the office of the secretary, Mr. Meredith Atkinson. Fig. 4 shows the old coal grate in another office, and Fig. 5 the same grate covered in with a metal backing against which a gas fire is fitted.

The Smoke Abatement Society's Installation.

What might be spoken of as the cradle of smoke abatement, the offices of the Smoke Abatement Society, situated at 7, Buckingham Palace Gardens, London, S.W.1, are also run on the principles which the Society advocates. The premises—which also include the offices of the National Trust for places of Historic Interest or Natural Beauty, and those of the Princess Louise Home for Girls—are heated by gas fires. Fig. 6 illustrates the gas fire fitted in the board room of the Smoke Abatement Society. This fire is one of modern design, and is installed against the marble surround of the old coal grate.

Built-in Gas Fire Installations.

We now come to method three, *i.e.*, the installation of built-in gas fires to economy flues, which have been specially constructed when buildings are being erected. This system of heating has spread at a more rapid rate than even the gas industry anticipated, and tens of thousands of such gas fires are now being installed in all parts of the kingdom. More than 20,000 have been fitted in Liverpool and large numbers in London, Manchester, Birmingham, Glasgow, Edinburgh and other large cities and towns. A good example of the adoption of this principle may be found at Knightsbridge Court, a block of flats in one of the best residential areas in London. There are over sixty flats in the building, and, with the exception of one room in each flat, the entire block is heated by gas fires. There are about 150 of these, each being ventilated into a concrete block flue, which is constructed in an approved manner within the thickness of the wall, and terminates above the ridge of the roof in the same manner as would the flue from a coal fire. The gas industry insists that this is the only correct position to terminate the flue from a gas fire, and only thus can the full value of the ventilating effect on an apartment be assured. The floor area of the flats at Knightsbridge Court has been materially increased by the construction of gas fire flues, and the consequent elimination of coal fire chimney breasts.

Mention was made at the Smoke Abatement Exhibition of a number of cases where city or local authorities were installing gas fires in their housing schemes. Firms who are carrying out residential building operations other than official schemes, are, of course, largely adopting the same principle. It is unnecessary to mention more than one such instance of what is extensively going on in the suburbs of cities and towns. The Great Western Land Co. are erecting 800 houses on their Elthorne Heights estate, Hanwell, and are installing two combined gas fires and mantel registers in each—a total of 1,600 gas fires.

Central Heating by Gas-fired Boilers.

A short reference to central heating by gas-fired boilers is not inopportune. This system is still spreading. Cinema proprietors and others are in some cases adopting gas-fired boilers for plenum heating and ventilating systems, and the owners of large private houses who require an easily controlled, reliable and constant heating system with no labour whatever involved, are also increasingly adopting gas for central heating purposes. A recent installation is one for a doctor connected with the University of London, in whose residence a gas-fired domestic water-heating and central heating installation has just been completed. All baths, towel rails, linen cupboard coils, sinks and lavatory basins are supplied from gas-fired boilers. The central heating installation comprises 29 "Classic" radiators with a total heating surface of 1,048 sq. ft., heated by 7 gas-fired boilers, each consuming 80 cubic ft. per hour. The total gas consumption, when heating up, is, therefore, 560 cubic ft. per hour. The whole system is very rapidly heated, and the gas consumption is then reduced to a very material extent.

Installations for Government Departments.

The Government, which strongly supports a policy of smoke abatement, is, through its various Departments, practising what it preaches. At the Prime Minister's house, 10, Downing-street, the main heating is carried out by a central heating installation with coke-fired boilers, and a number of gas fires have been installed as auxiliaries thereto. When Mr. Baldwin took up occupation, Mrs. Baldwin, in order to increase the comfort of the domestic staff, also had gas fires fitted in their bedrooms and sitting-rooms.

In pursuance of the rigid economy which is so urgently called for in public affairs, the premises of the Ministry of Pensions are heated by gas fires. The simplicity of control, the saving of labour, and the economy in the cost of the installation of gas fires resulted in 25 gas fires being fixed as the sole heating medium for the premises, these being installed in the medical inspection rooms, waiting rooms and offices. Economy in running cost is also assured, as modern efficient types of gas fires are now less costly than solid fuel for such premises, owing to the degree of intermittency connected with a set of offices containing a number of rooms.

Dr. Fishenden, in her paper, to which previous reference has been made, stated: "Gas fires for periodic use aggregating only a few hours a day, generally prove in practice decidedly cheaper than either coal or coke fires." When further allowance is made for saving in labour, it is not surprising to find that the same heating system as that employed at the Ministry of Pensions is being extended to the adjoining premises for the use of the Ministry of Labour.

Boilers and Heating Appliances.

Messrs. Hartley & Sugden, Ltd., of Halifax, inform us that they will be pleased to forward their new 1926 General Catalogue to those of the trade interested, upon request. An announcement of importance is that this firm has brought out two new models of its "Thermostove" kitchen stove. Fresh features are the sliding oven doors, the introduction of a shaking grate making it possible to burn anthracite. The catalogue, in addition, gives a fully-illustrated description of the firm's varied stock of boilers of all kinds, radiators, piping, &c.

Electric Power in the Home.

At a luncheon given by the British Electrical Development Association, on Tuesday, Mr. L. B. Atkinson said that in about seven million homes, only a million and a quarter had adopted electric power in any form. Outside their homes working people found the brighter life and conveniences achieved by electricity everywhere available, but in their homes they still put up with ill-lighted space and dirty methods of heating and cooking. When the Electricity Bill had become law, smaller electric stations would give way gradually to a supply from larger stations. We should be able to have an electricity supply which, in cheapness, would vie with countries where they had supplies derived from water power; but it was necessary that the electricity should be used universally. That was the object of the campaign.

VENTILATION

By H. PIKE, B.Sc.

THE object of ventilating buildings is to maintain healthy standards of temperature, humidity, freedom from noxious odours and harmful suspended solid matter of the air that is to be breathed. It has been established by Dr. L. Hill that, apart from temperature, the important factor for comfort and health is the humidity of the air which largely governs the rate of evaporation of perspiration. The Board of Trade now recognise the importance of the humidity, as in the regulations for the ventilation of cotton sheds a definite relative humidity range is prescribed instead of a carbonic acid content maximum of the air.

The requirements for ventilating mines are practically the same as for building ventilation, but no preliminary treatment of the air is undertaken owing to the great volume of air used. In building ventilation the air is drawn through the heating and washing apparatus by the fan and is then blown via the ducts to the rooms. It is drawn away by a shaft or fan. For this article the above cycle is followed except that both types of fans are considered together and the air itself is considered first.

The Air.—The air is a mixture of gases and a slight proportion of suspended solid matter. Dry, clean air consists of —

	Per cent.
Oxygen	20.99
Carbonic Acid	.03
Nitrogen and Inert Gases....	78.98

The analysis is carried out by absorbing each constituent in turn by a suitable reagent and noting the diminution in volume in each case. A suitable apparatus for this analysis has been designed by Bone and Wheeler. Often the carbonic acid is required to greater accuracy, in which case it is determined by absorption from a known volume of air by standard baryta water, the excess of baryta being determined by titration with standard oxalic acid solution. There is also another method due to Haldane, where the actual volume decrease caused by absorbing the carbonic acid gas is measured. The actual percentage of carbonic acid gas is not now considered to be of great importance, as up to three per cent. in air has been proved to be harmless; but the efficiency of a ventilating system may be measured by estimating the change in the carbonic acid content which may have been artificially increased.

The solid matter may be determined by several methods. The simplest is by exposing a sheet of stiff white paper which has been covered with a thin layer of sweetened condensed milk for a definite time. The darkening may then be compared to a standard or previous test papers if desired. When microscopical and chemical analysis is also necessary, a large volume of air is bubbled through water, the volume of water is reduced by evaporation, and the analysis carried out on the small volume of liquid now containing the solid matter. There are two methods of actually counting the particles. Aitken forms a fog in a definite volume of air and leaves it to settle on a glass plate. He therefore makes the assumption that each mist globule has one solid particle as a nucleus. In another method a jet of air is caused to impinge on a vaselined microscope slide and the particles counted from a known volume of air.

The Research Department of the American Society of Heating and Ventilating Engineers (referred to as the A.S.H. and V.E.) have devised an apparatus for ascertaining the dust in the air, which has many refinements. It is based on a method long in use in Glasgow, in which a volume of air is drawn through a blotting-paper disc of definite area and the colour obtained is compared with a standard series of tinted papers. The paper disc may also be weighed before and after the experiment, giving the weight of the dust in the particular volume. The solid matter varies in composition and quantity from place to place. In London there is much dust in the atmosphere, whereas in mid-ocean there are but 200–300 particles per cubic centimetre. A dust from the top of a bedroom cupboard gave on analysis:—Moisture 4.4 per cent., organic matter (of vegetable and animal origin and particles of carbon) 52.6 per cent., and inorganic matter 43.0 per cent. The microscopic examination has also led to the identification of definite bacteria in the air.

The moisture in the air may be chemically determined by the use of calcium chloride or by physical methods (1) the dew point method, and (2) the wet and dry bulb thermometer method. The latter is in common use, the result being obtained as the relative humidity which is the fraction of saturation of the air at the particular temperature. The graph to which the wet and dry bulb temperatures are referred is known as the "psychometric chart."

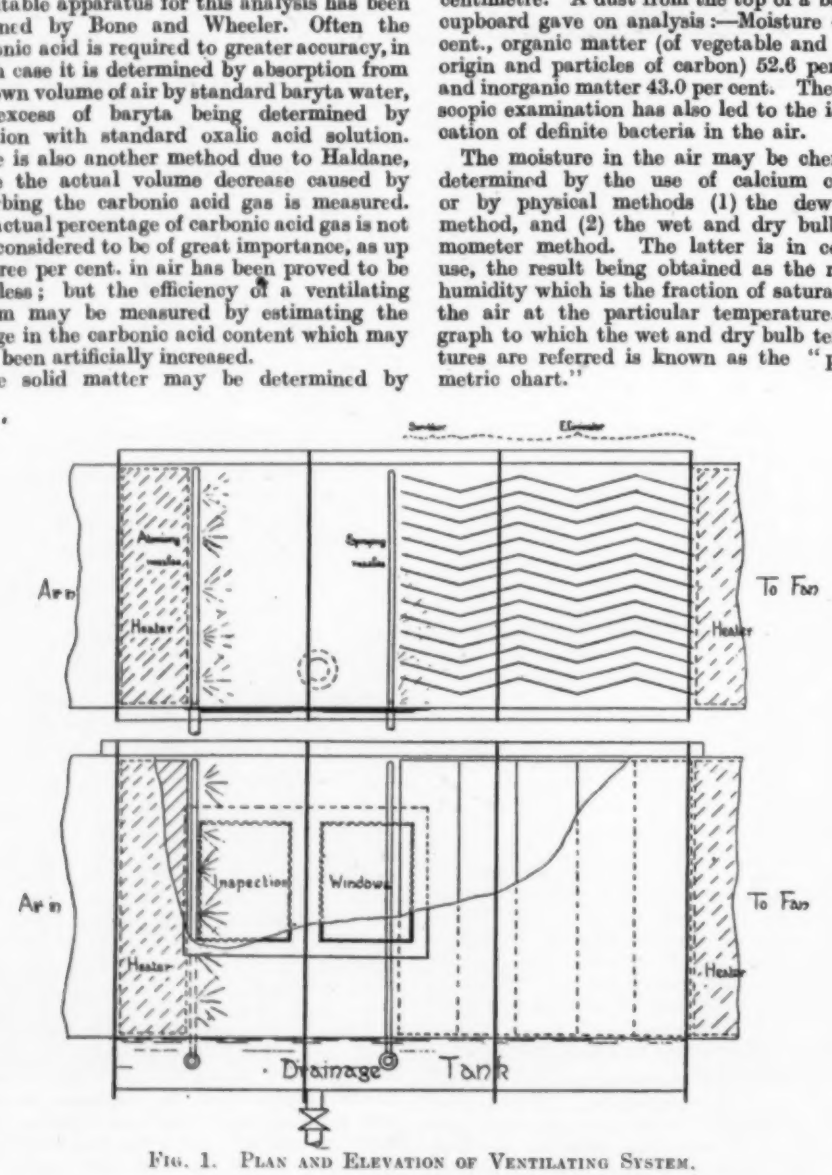


FIG. 1. PLAN AND ELEVATION OF VENTILATING SYSTEM.

The relative humidity of the outside air varies from 35 per cent. to 98 per cent., the latter figure only being attained in mists. A suitable humidity range for conditioned air is 45 per cent. to 60 per cent. Air that is drier than 45 per cent. as yet has not been proved to be harmful, but more humid air is undesirable, although its effects have not been separately enunciated from those of warm air. The humidity of the air may be recorded by a polymeter, an instrument due to Lambrecht, in which the change in the moisture in the air changes the length of a bunch of prepared hair. A desirable range of temperature for apartments is from 60 deg. to 68 deg. (F.), or a wet bulb temperature of 54 deg. to 58 deg. (F.).

A special instrument has been devised by Dr. L. Hill, which is called the "Kata," or comfort thermometer. It is a wet and dry bulb thermometer. A Kata thermometer reading is the difference in the times of cooling from 100 deg. (F.) to 90 deg. (F.) of the wet and dry bulb thermometers. The "Kata" reading is then the heat lost by the thermometer due to evaporation just around blood temperature. It is possible to estimate the separate effects of air movement, radiation and evaporation. The Kata thermometer is the outcome of a suggestion of Heberdin (*Trans. Royal Soc.*, 1826) that the rate of cooling is the determining factor of comfort.

The effect of wind, humidity and temperature on the cooling of a test surface of sheepskin has been quantitatively worked out by the New York State Ventilation Research Committee. Their results are not directly applicable owing to clothing, but it is to be expected that the results are indicative of the action on bare flesh. The Research Department of the A.S.H. & V.E. have established lines of equal comfort on the psychometric chart by experiments on persons; their results are, therefore, applicable to the relative humidity, temperature and air velocity attained in ventilating systems.

Ventilation System.—The intake should be in a position free from contamination, with preferably a north aspect. The opening of the white tiled duct should have a suitable grid over the end. If the duct is large enough it is convenient for bringing in the fan and motor. The apparatus for treating air consists of a preliminary heater, using steam or hot water, followed by a system of nozzles forming a fine spray (Fig. 1). This travels with the air stream to a series of plates sprayed with water, which give several changes of direction of flow to the air, causing the water particles to strike the wet plates, thus clearing the mist first formed. The air passes through a second heater, which brings it to about 68 deg. (F.), and it is found to have a humidity of 45 per cent. to 60 per cent. after the treatment. It is only usual to heat the air sufficiently to prevent complaints of draughts, as if the heating of the building itself is attempted by the ventilation installation the air has a noticeable burnt odour which adversely affects the nervous condition of people subjected to the atmosphere. The only other treatment now to be undertaken is the addition of ozone. A recommended quantity to add is 0.1 to 0.2 parts per million. It is supposed to destroy many smells and is specially recommended where, as often is the case in America, the air is recirculated. It seems probable the ozone would be capable of oxidising or reducing much odour, but the New York Research Committee found it to have no such effect and probably to aggravate the condition. There is a rapid colorimetric method of estimating ozone.

Quantities for Ventilation.—The earliest attempt to prescribe a definite standard for ventilation was made by de Chaumont, who stated the carbon dioxide should be kept within two parts per ten thousand of the outside air. Shaw and Hill both deduce definite volumes of air to be allowed per person per hour, which are based on the amount of heat lost under ordinary conditions. The research department of the

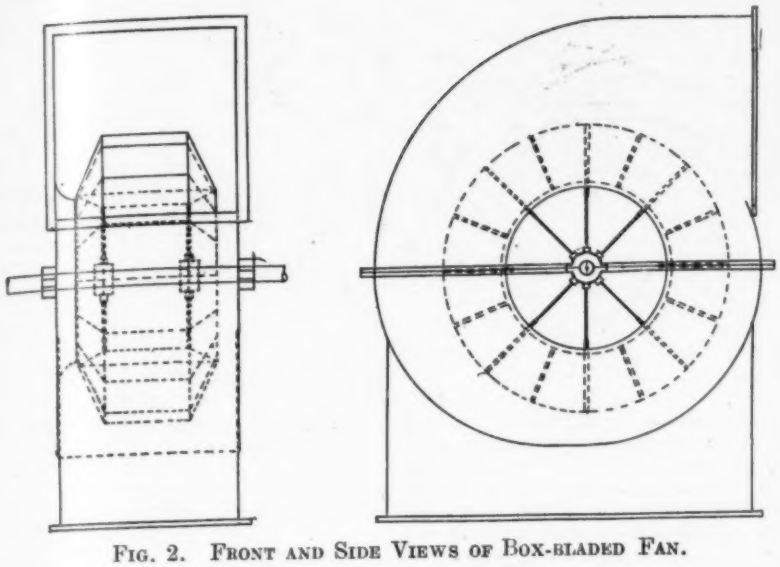


FIG. 2. FRONT AND SIDE VIEWS OF BOX-BLADED FAN.

A.S.H. & V.E. give the change to 1,800 cubic feet of air in which a person has breathed for one hour as an increase in temperature of 7.9 deg. (F.) and an increase of 6 grains of water per pound of air. One writer in the reports of the A.S.H. & V.E. has insisted that the amount of ventilation should depend on the use and position of a building. The Americans have now specified a standard atmosphere, in which the conditions and constituents are accurately prescribed. Expired air has been found to have: Nitrogen, 76 per cent.; oxygen, 15 per cent.; carbonic acid, 4 per cent.; water, 5 per cent.; and it will rise in air in which the temperature does not exceed 81 deg. (F.)

Fans.—Fans are of two types—centrifugal fans and disc fans—and are built in a very great range of sizes. Centrifugal fans are capable of use for blowing or exhausting. Disc fans are capable of moving a larger quantity of air than centrifugal fans, but only against a much lower pressure; they are chiefly used for exhausting. Centrifugal fans are built with variously shaped vanes, either radial blades, forward concave or forward convex, and there is a considerable variation in the number. The inlet is along the shaft, giving pressure outside the periphery. The rotor is arranged in a scroll casing, and the discharge can be arranged in any direction in the plane of the blower. The most efficient shape for blades is concave forward, as is shown by the curves of pressures thrown by fans against the outlet area, which is called the blast area. Curved blades should be arcs of a circle to obtain a uniform acceleration for the air, and (in Figs. 5 and 6) the angle x should be such that there is no impact with the blade on entry. The angle β should be as great as possible; in some fans it is greater than a right angle. For a blade that is convex forward, the path of a particle is given by the curve A B (Fig. 5).

The volume of air delivered is proportional to the speed up to a certain value, above which there is no increase. Fans usually have a horse-power efficiency of 40 per cent. to 75 per cent. For variable duty a damper device may be employed, or different speeds are attainable where an alternating current motor or cone pulleys are used. The first fans were used in mine ventilation and were of the Capell and Guibal types.

Disc fans, or ring fans, are used for exhausting the air; they have flat or curved blades, like a ship's propeller, although the number of blades usually exceeds four. They have a working speed of 1,000 to 2,000 ft. per minute of the tips of the blades. They are fixed in an opening in a wall and exhaust from a large space, not usually from a duct. The horse-power efficiency is usually from 40 per cent. to 60 per cent. The volume delivered is proportional to the speed of the blades. Box-bladed fans (Fig 2) have 25 per cent. to 30 per cent. greater capacity than straight-bladed fans of the same diameter. The fans are fitted with a shutter on the discharge side for starting. They are very sensitive to back pressure due to wind. When belt-driven, a higher pulley efficiency is obtained with a higher speed.

Ducts and Flow in Ducts.—Air ducts are made of glazed bricks, rendered concrete, smooth finished lath and plaster or galvanised iron. All ducts should be accessible for cleaning. They are usually square, circular or rectangular in section. Since the chief losses of pressure in ducts are due to changes in the direction of flow there should be no square corner elbows, but rather bends, and there should be no abrupt changes in sectional area. An overall heat loss in ducts is usually estimated at 5 deg. (F.) The velocities in ducts vary from 500 to 1,500 ft. per minute, the upper limit being determined by absence of noise.

The resistance offered by bends of various radii is given as a length of pipe (Fig. 3) expressed as a number of diameters of the pipe.

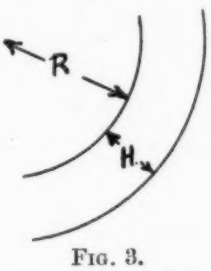


FIG. 3.

Radius.	*No. of diameters of duct offering same resistance.*
Square corner	100.0
$\frac{1}{4}$ H	65
$\frac{1}{2}$ H	30
1 H	10
$1\frac{1}{2}$ H	6
$1\frac{3}{4}$ H	5
2 H	4.3

Branches if convenient should be at about 30 deg., but they should not incline at a greater angle than 45 deg. Losses of energy occur when the sectional area of the duct is changed. The loss of energy is very small when the sectional area of the duct is gradually reduced, but greater losses occur when the sectional area is increasing in the direction of flow. The recommended angle of divergence of the sides is from 5 deg. to 7 deg. The energy losses due to bad alignment of the sides of ducts are also contributory to the large general loss of energy in ducts.

The law governing the flow of air in ducts is expressed as— $H = R V^n$

where H= the aeromotive force (pressure in inches of water),
V= the volume of air (cubic ft. per minute),
R= the resistance.

The index n has been given several values: for stream line flow $n=1$, and for turbulent flow $n=2$; other values are also given for special cases. As an outcome of the research of Reynolds, Rayleigh, Stanton and Pannell a knowledge of the critical velocity, viscosity and density of the fluid and the diameter of the pipe has been condensed into the equation—

$$U_k = \frac{20{,}000\, n}{d\, m} \text{ (in metric units)}$$

Where n is the viscosity of the fluid,
U_k is the critical velocity (velocity at which flow changes from stream line to turbulence),
m is the density of the fluid, and
d is the diameter of the pipe.

The following values are based on the formula for air:—

Diameter of pipe ..	4 in.	10 in.	20 in.
Critical Velocity, ft. per min. ..	60	24	12

When it is considered that the recommended velocity in ducts is from 500 to 1,500 ft. per minute, it is obvious that only turbulent flow can be considered; the formula can then be expanded further to $H = \frac{K S V_1}{A}$ where K is a constant for the material of the duct, S is the surface rubbed, and A the sectional area. The chief means of measuring the flow of air in ducts are by anemometers and Pitot tubes. Such factors as humidity only become important when greater accuracy than 1 per cent. is required, which is not usually necessary in ventilation work. Ordinary anemometers measure the total flow in a particular length of time; when quantities are required readings of pressure, temperature, area of pipe or duct and the calibration factor of the anemometer must be known. It is possible to measure velocities directly. Anemometers are only accurate over a small range of their scales and require frequent calibration. The large cup type is not used in ventilation work.

Pitot tubes are usually used for smaller ducts. The simplest consists of a tube whose mouth is turned towards the flowing air, and a second tube placed straight into the duct so that the stream passes across the mouth of the tube; they are then connected to the two limbs of a U gauge. If the two mouths of the tubes are at the centre, then the velocity equals $(2g\ 0.8\ H)^{\frac{1}{2}}$ where g is the gravity factor and H is the pressure difference measured in the U gauge. Velocity readings should not be taken at points in the duct which immediately

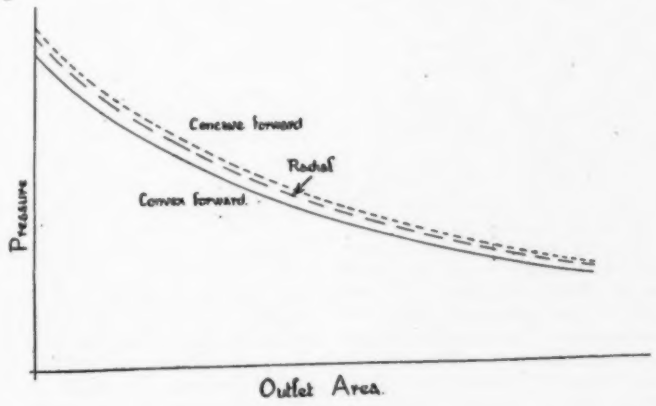


FIG. 4.

follow a bend or branch, as inaccurate results will follow.

Another means of extraction of air from buildings is by a shaft. In this case there are two sources of power, viz., due to air currents across the top of the shaft and the temperature difference of the air inside the shaft and outside. Air currents acting on the end by direct current exert a pressure $p = \frac{1.17\,u^2}{2g}$ where u is the velocity, and g the factor of gravity; when the wind is blowing across the end, the suction effect is given by

$$S = \frac{u2}{2g}$$

The suction effect is dependent on the size of the opening and on the wind velocity.

When the effect of a shaft is due to temperature difference, it is given in pressure units by—

$$\frac{H P_o}{C}\left(\frac{1}{Ta} - \frac{1}{Tc}\right)$$

where C is the gas constant,
Tc the temperature of the air inside,
Ta the temperature of the air outside,
H is the height of the chimney,
P_o is the pressure at the foot.

Where friction is ignored the velocity becomes

$$u^2 = 2\,g\,H\,\frac{Tc - Ta,}{Ta}$$

Registers and Rooms.—It is unusual to bring the air into a room by an open-ended duct; a grille of perforated ironwork of suitable design is used. To obtain an even distribution of air over the whole area of the grille guiding sheets are put into the duct. In designing a system the clear area of the register grille must of course be known, as the duct opening is designed accordingly.

The air entering a room has a definite energy due to its rate of travel; this is lost in the room and has to be exerted by the extracting fan.

The temperature of the ingoing air should be close to that of the room, otherwise draughts will be felt; it is also apparent that the temperature decides whether the air will rise or fall on entering; it is desirable that the ingoing air should be 1 deg. or 2 deg. (F.) below that of the room.

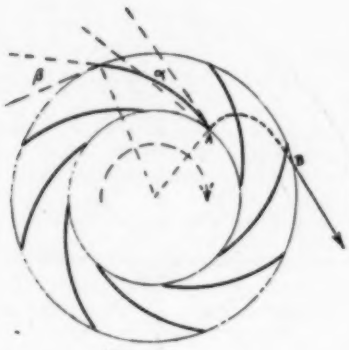


FIG. 5.

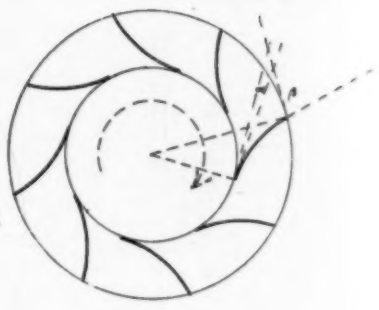


FIG. 6.

The velocity of the ingoing air is arranged according to the size of the apartment, and is preferably introduced about 8 ft. from the floor level. A great amount of air movement is caused in rooms by the persons occupying the room. These eddies and currents can be followed by a suspended silk fibre, and the vertical velocity can be ascertained by a small anemometer having very light mica vanes. It is recommended by most authorities that the air should be introduced above head height, but various authors recommend upward ventilation, and others downward ventilation. In some special cases, as audience halls, the air may be introduced at the floor level by "mushrooms," usually placed under seats. A room is looked upon as having no resistance to the flow of air. Extraction registers for small rooms should be at window sills, or the extraction duct rises through the floor from the exhaust chamber.

The system so far considered has been the "Balanced" system, in which the air is blown in by one fan and extracted by another. In this system it is usual to have the air-treating plant on the suction side of the pressure fan, as it is somewhat more satisfactory than on the discharge side. The pressure fan is designed to have 15 to 25 per cent. more throughput than the extracting fan to allow for leakage, thus preventing the influx of untreated air except that due to strong gusts of wind. The particular advantage of this system over the natural exhaust by shafts is that the extraction by a fan is certain.

It is here convenient to indicate the resistances throughout the whole system:—

Pressure Side.

	Inches of Water Gauge.
Intake duct	0.1 to 0.2
Washer and heater	0.45 „ 0.65
Distributing ducts and registers ..	0.45 „ 0.65
Maintained resistance	1.0 to 1.5
Add to maintain a suitable velocity	0.3 „ 0.6
Total pressure of fan	1.3 to 2.1

Extraction Side.

Registers and ducts	0.25 to 0.55
Discharge	0.1 „ 0.21
Maintained resistance	0.35 to 0.76
Add to maintain a suitable velocity	0.25 „ 0.75
Total pull of extraction fan ..	0.60 to 1.51

For such a high necessary vacuum a centrifugal fan would be used.

In the general design of a system it is, of course, bad practice to run ventilation ducts through fireproof partitions, and considerable care has to be paid to the problem of eliminating possible transmission of sounds and cooking smells. The distribution ducts can be arranged on the main trunk system, or on the pressure chamber system, which latter gives control to each duct from the plenum chamber.

HOT WATER SUPPLY AND HEATING INSTALLATIONS

THE LABOUR ITEM IN CONTRACT WORK.

To estimate successfully the amount of labour required in connection with the plumbing, hot-water supply, and heating installations in an extensive modern building is a task beset with anxieties and risks, in overcoming and avoiding which the following qualities, in addition to those already mentioned, are necessary:—(1) A thorough knowledge of the type of labour available, and the amount thereof required to carry out a specified amount of ordinary work executed under ordinary conditions. (2) Ability to discern any sections of the work which present unusual difficulties, and consequently demand a greater amount of labour than is usually the case. (3) A keen insight into human nature, coupled with the gift of being able to pick out those workmen whose natural abilities fit them for leadership. (4) The quality of being able to choose the right man or men for a given task. A skilled workman does not always make a good leader or foreman, but the best foreman is one who, in addition to possessing the necessary strength of character and mental alertness, is also a skilled workman or mechanic; the successful employer is not slow to pick out men of this type, and, if he does not do his own estimating, he should not fail to bring these men and their outstanding abilities to the notice of those who make out the estimates. It is a decided advantage if the person who makes the estimate has intimate knowledge of foreman and others who are placed in control of work; he should also have some general knowledge of the quality of the labour that will be called upon to carry out the work for which he prepares the estimate.

On jobs of what may be termed the ordinary kind—that is, where the piping systems are fairly direct and free from unusual features—it is possible to estimate labour and materials together at certain prices per foot run; and where the various fittings are of a standard and well-known type the amount of labour required for their fixing and connecting up presents no unusual difficulties. But when the installation presents a number of uncommon features, and the changes of direction in the piping system are so numerous that the number of cuts and threads to be made is much greater than is usually the case, and where the fittings are of a new, unknown, and possibly complicated type, the amount of labour necessary in connection therewith calls for special consideration. Under such circumstances a wise procedure, if the estimator is himself a skilled mechanic, is carefully to consider the matter in order to arrive at the additional amount of labour that would be necessary if he were to carry out the work himself, or if it were carried out by a number of men each of whom possessed ability equal to his own; to the extra amount of labour thus arrived at it will be necessary to add what may be termed a safety margin, by which is meant a percentage, which must be added because all workmen do not possess the same degree of skill, nor will they all endeavour to do the work as quickly as would the employer himself. It is not possible to state the percentage of extra labour that it is necessary to add to cover this safety margin, as it will depend on the quality of the labour available.

Other factors which may demand special consideration when estimating the amount of labour required are: (1) When machinery or operating mechanical appliances have to be unloaded, installed, and connected up—as a general rule it will be found that, so far as the labour is concerned, the installing and connecting up of machinery demands special consideration for each separate job; (2) the amount of rail, motor, or other transport necessary, and any special difficulties connected with loading and unloading; (3) the likelihood, when the contract will extend over a long period, of an increase in the cost of labour; (4) any time and expenses for travelling which may have to be granted when workmen are sent to a job which is situated at a distance; (5) any professional whims of the architect, and any exceptionally high quality of workmanship and finish which he or the owner may demand.

There are also one or two factors so closely allied with the cost of labour as to warrant their being taken into consideration when the labour estimate is made out. These are: (1) The cost of artificial light, the source of which

may be either electricity, acetylene, oil or candles; (2) the cost of any special plant or tools necessary; (3) the cost of oil fuel for the furnace, and of coal and coke for the fire and forge.

It is an easy matter to overlook a really considerable item connected with a contract, consequently those responsible should always be on guard against such oversights.

The power possessed by an architect to influence, beneficially or otherwise, the financial result of a job should never be overlooked. Some architects pay much attention to details and may insist that quite small and seemingly unimportant matters connected with the work shall be carried out in strict accordance with their written and verbal instructions, which, to the contractor, may sometimes seem unnecessary, and detrimental rather than helpful, to the attainment of a good, solid, and practical job. A wise and business-like contractor will always endeavour to meet the architect's wishes in their entirety, and will not attempt to thwart him, or to ignore his instructions, even in connection with minor matters. The writer knows of cases where contractors have incurred heavy financial loss because of having failed to comply with the architect's wishes in connection with the smaller and apparently less important parts of the work.

A necessary adjunct to successful tendering is skill and tact in the control of labour. Workmen vary greatly in skill, speed, and willingness, and it will be found a real economy to employ labour of the first quality. It does not follow that by employing labour at a low figure an employer will secure for himself an extended margin of profit; not infrequently the reverse will be found to be the case. The workman who possesses the highest degree of skill and intellect usually receives the highest wages, and in most cases it is this type which secure for the employer the highest profits. As with the mechanic, so with the mate; the most profitable mate or labourer being one who possesses the combined qualities of intelligence, strength, and of being always willing to give the best service he is capable of.

It sometimes happens that unexpected and rather serious difficulties present themselves in connection with a job or a certain section of it, and that the workman, in spite of the most praiseworthy efforts, is unable to satisfy even himself with the progress made; when such is the case an employer who is alive to his own interest will make it clear that he fully understands all the difficulties, and is aware of and appreciates the efforts made by the workman to overcome them; further, when circumstances permit, the employer should show his appreciation in some practical manner, even though on that section of the work he should be faced with a financial loss.

CENTRAL HEATING—CALCULATION OF HEATING SURFACE

BY A HEATING ENGINEER.

TWENTY-THREE years ago the writer happened to be present when a well-known consulting heating engineer paid a visit to a fairly large country residence for the purpose of estimating the amount of heat for warming the building by a low-pressure hot-water heating installation. The method of procedure was as follows: The engineer took measurements for the cubical contents of a room, then glancing around said, "Window area normal; no unusual features." Next, a few calculations were rapidly made in his note-book, following which he gave the amount of radiation required for that particular room. The owner of the building referred to had been assured that the installation of a heating apparatus would result in quite a number of advantages, including the following: (1) The building would be more efficiently and more uniformly warmed throughout; (2) there would be a considerable saving in labour, as no coal would have to be carried to the various rooms, nor would any ashes have to be removed from them, and, further, the various fireplaces would not need cleaning every day; and (3) there would be a considerable saving in the cost of fuel.

Two years afterwards the writer asked the owner if the heating apparatus (which had then served through two winters) was giving satisfaction, and the reply was, "I decided to have hot-water heating because I was told that fires in the rooms would then be unnecessary, whereas the actual result is that an extra fire (the boiler fire) has to be kept going, due to the fact that (except in very mild weather) the heating apparatus does not warm the house sufficiently—I am very disappointed."

The cause of the owner's disappointment will be better understood if a few particulars are given. One of the rooms in the residence has a cubic capacity of 1,080 ft., and the area of its window and exposed wall surface was not unusually extensive. Three "short cut" rules for estimating radiation give the following as the number of sq. ft. necessary satisfactorily to warm the room under consideration: 12½; 16; 18. One of the rules was used by the consulting engineer mentioned. It is interesting to note that the amount given by the third rule is nearly one-half more than that given by the first, the figures being 12½ and 18 sq. ft. respectively, whilst the other rule gives 16 ft. One of the three calculations may, or may not, be correct, but obviously two of them must be wrong. Two years ago it came as a surprise to find that calculations for the warming of a residence in a London suburb were being made by one of these "short cut" rules, and as this very faulty and incorrect method does not appear to have been entirely abandoned, this article has been written with the intention of explaining a method of making the calculations that will give correct and satisfactory results; this is known as the British Thermal Unit Method.

The British Thermal Unit is $\frac{1}{180}$th of the amount of heat necessary to raise one pound of water from 32 deg. to 212 deg. Fahrenheit; and is often referred to as being the amount of heat necessary to raise one pound of water one degree Fahr.

Before proceeding to deal with actual calculations, it is necessary to direct attention to the following very important factors connected with the warming of buildings:—

1 There is a considerable loss of heat from buildings due to the absorption by the various materials used in their construction—walls, windows, doors, and other parts of a building.

2. The transmission of heat is always from a warmer to a cooler body, consequently so long as the temperature inside a building is higher than that of the outside air, there will be a constant loss of heat by transmission through the walls, windows, doors, floor, partitions and ceiling or roof.

3. The outer walls, the glass of the windows, and the outside doors, form the principal heat-losing surfaces of a room (usually termed "exposure"). The heat lost through an outside door will be about equal to that lost through a window having the same area; with thick, well-made doors the loss may be slightly less, but so small is the difference that it is scarcely necessary to give it special consideration.

4. Around all windows and doors a certain amount of heat is lost, and in cases of poor construction this loss may be considerable. Air of a lower temperature finds its way into the building (air change), and the heat necessary to warm this incoming cold air is referred to as heat loss due to infiltration. Air of a higher temperature finds its way out of a building, and the heat so lost is referred to as heat loss due to transmission.

5. The warming of a room is due mainly to the air therein coming into contact with the heated surfaces of the radiators and pipes, connected onary currents being thereby set up. When these air currents come into contact with cooler surfaces such as outside walls, doors or windows, heat is given up or lost; the amount of this loss can be accurately calculated, since the rate of heat transmission through the various materials used for building purposes is now known. As the result of many experiments and numerous calculations much valuable data relating to the quantity of heat transmitted by various substances in a given time is now available, and some of the more important co-efficients connected therewith are given in this article.

6. When a building is exposed, as may be the case with a house in the country, or with a town house standing on an exposed corner or isolated from other buildings, the positions the rooms occupy with relation to the points of the compass should be noted, as also should the direction of the prevailing winds in the winter. Rooms exposed to the north and east may require from 15 to 20 per cent. additional radiation to the amount found to be necessary by calculating the total heat losses, &c. Rooms having a height of over 12 ft. also require extra radiation, the extra amount necessary for the various heights being as follows:—15 ft., add 5 per cent.; 18 ft. to 20 ft., add 10 per cent.; 25 ft. to 30 ft., add 15 per cent.

7. A very important factor is that rooms having a fireplace with an open flue lose a considerable amount of heat owing to the current of air that is continually passing through it. Unless the flue is sealed up additional radiation must be provided to make good the heat lost. It is possible that the overlooking of this fact accounted for the unsuccessful heating of the residence mentioned in the beginning of this article. The amount of radiation that must be added for each open flue will depend mainly upon its area and height, but in the majority of cases an addition of from 15 to 20 per cent. will be found to be sufficient. It may be pointed out, however, that in a country mansion (an ancient castle built of stone) having open hearths, it was found necessary to install almost double the amount of radiation that would otherwise have been required, in order that the building might be warmed satisfactorily.

8. In buildings having a central heating installation the various apartments are, in nearly all cases, warmed by cast-iron radiators, a term which is rather misleading, since very little heat is given off by actual radiation from metal surfaces that derive their heat from hot water or steam. The greater part of the heat lost by such surfaces is taken up by the air currents coming into contact with them, the temperature of the air being thereby raised. It would be far more correct if the surfaces of radiators and pipes used for warming rooms, &c., were referred to as "heat-losing" surfaces, since the heat they part with serves to warm the rooms and other structures. Consequently, when the terms "radiation" and "heating surface" are used in this article it must be understood that they refer to such heat-losing surfaces as those mentioned. The number of B.T.U.'s given off by each square foot of heat-losing surface depends upon the design of the radiator (height and number of columns), the temperature of the heating medium (steam or hot water), and in the case of direct-indirect, or indirect radiation, upon the velocity and temperature of the air which passes over or between the sections. It is assumed that direct radiators will be standing in what is generally termed still air, and even under those circumstances the temperature of the air surrounding the radiator affects the rate of heat transmission.

9. Since water is the greatest absorber of heat known, it follows that outside walls built

of materials that will absorb large quantities of water will, in wet weather, prove a means whereby an enormous amount of heat may be lost. The possibility of this should be noted, and any extra radiation that may be necessary should be provided.

10. The amount of heat necessary to raise a piece of masonry weighing 5 lbs. 1 deg. in temperature would raise 50 cub. ft. of air 1 deg.; it therefore follows that if through bad stoking, the indiscreet opening of windows, or owing to other reasons, the rooms are allowed to cool frequently, with consequent loss of heat by the walls, the heat so lost must again be added to them before the room can once more be satisfactorily warmed. The loss of enormous quantities of heat is sometimes due to the causes just mentioned. In terrace houses in towns an allowance of one air change per hour will be found sufficient, provided that the windows are kept closed, and that the room has no open fireplace having an active chimney. In the case of exposed residences in the country it may be necessary to allow for two or perhaps three changes of air per hour in some of the more exposed rooms.

When estimating the amount of radiation necessary to warm a building, the total heat losses from each room are added together, and their sum in B..T.U.'s is divided by the number of B.T.U.'s given off per hour from a square foot of the radiating surface; the quotient will give the number of square feet of radiation necessary to warm the room successfully under normal conditions. To the sum thus obtained must be added the percentages or allowances necessary to cover any additional and exceptional heat losses that may be found to exist; the more important of these additional losses have already been pointed out. The heat loss due to infiltration is obtained by multiplying the cubical contents of a room by the number of air changes per hour, multiplied by ·02 (the amount of heat required to raise the temperature of one cubic foot of air one degree Fahr.), and then multiplied by the difference (in degrees Fahr.) between the temperature of the outside air and the desired temperature inside the room.

Transmission losses vary according to the nature of the materials of which the walls and various parts of the building are constructed. The amount of heat (in B.T.U.'s) transmitted per square foot per hour for each degree difference between the internal and external temperatures, by the more common building materials was as follows:—

Brick Walls.—4½ in. = 0·5.
9 in. = 0·35.
14 in. = 0·27.
18 in. = 0·23.
22 in. = 0·2.

Concrete Walls.—4 in. = 0·57.
6 in. = 0·48.
8 in. = 0·41.
10 in. = 0·36.
12 in. = 0·32.

Windows.—Single, 1·03.
Double, 0·48.

Skylights.—Single, 1·11.
Double, 0·5.

Doors are usually classed as single windows of the same size, the full extent of the opening being measured.

Partition of 4½ in. timber lathed and plastered both sides 0·33.

Flat ceiling of bedroom, with space above between ceiling and roof 0·40; for the purpose of making calculations, a temperature of 45 deg. F. may be allowed for the unheated space between the ceiling and the roof, during the heating season.

Floors.—Boarded floor, with space between the floor joists and the bare earth, 0·13; if with 6 in. of concrete on the earth, 0·05.

Concrete Ground Floor.—Concrete 6 in., cement screed ½ in., total thickness 6½ in.; with 1½ in. wood blocks on screed, 0·25. Floor of armoured concrete 5 in. thick, with 1½ in. wood blocks on screed, the under side of the concrete being plastered to form ceiling of the room below 0·20. Floor of 1½ in. boards on joists, the under side of the joists being lathed and plastered to form ceiling of the room below 0.07.

When measuring rooms and making calculations for the purpose of estimating the amount of radiation required, it will often be found helpful if a rough sketch is made which may be referred to when away from the job, the points of the compass should also be indicated on this sketch.

An example illustrating the use of the B.T.U. method of ascertaining the amount of radiation necessary for the satisfactory warming of rooms, apartments and places of assembly may now be given. The illustration reproduced is the ground floor plan of a villa. Basement apartments under the ground floor cover a similar area. The boiler is placed under the kitchen, and as the main circulating pipes (which are not insulated) are carried around the building at a point just below the ground floor, the temperature of the basement will be about equal to that of the rooms above, consequently there will be no loss of heat from the ground floor to the rooms underneath. As all the rooms on the ground floor will be heated to the same temperature, there will be no loss of heat through the internal walls separating the various rooms. The rooms on the first floor also being heated, there will be practically no heat loss through the ceiling and the floor to the rooms above, unless the radiators on the first floor are shut off for a number of hours each day.

In the instance under consideration, it is assumed that there will be a difference of 30 deg. F. between the outside and inside temperatures, with one air change per hour in the sitting-room, and one and a-half air changes per hour in the dining room. Taking the sitting room first, the cubical contents are 14 ft. × 12 ft. × 9 ft.=1,512 cub. ft.; then 1,512 × 0·02 × 30 × 1=907·2 B.T.U.'s infiltration loss per hour. The area of the exposed walls is 14 × 9 + 12 × 9 = 234 sq. ft., from which must be deducted the area of the windows, 38·5 sq. ft., then 234 − 38·5 = 195·5 sq. ft. net wall area; 195·5 × 0·35 × 30 = 2,052·75 B.T.U.'s total transmission loss through walls per hour. There are two windows one being 4 ft. wide, the other being 3 ft. wide, each having a height of 5 ft. 6 in., their total area being 38·5 sq. ft.; then 38·5 × 1·03 × 30 = 1,189·65 B.T.U.'s total transmission loss through windows per hour; adding the losses together we have 907·2 + 2,052·75 + 1,189·65 = 4,149·6 B.T.U.'s, which is the total heat loss per hour from all sources (ignoring the flue) then 4,149·6 − 144 = 28·8 which is the number of square feet of radiation required for the room. As there is a fireplace having an open flue in the sitting room, 15 per cent. must be added to the 28·8, which brings the total radiation necessary properly to warm the room, to 33 sq. ft. The divisor 144 is the number of B.T.U.'s which it is assumed will be given off by 1 sq. ft. of hot water radiation per hour. When low pressure steam is the heating medium, the divisor should be 250 instead of 144.

The calculations for the dining room will be rather different from those for the sitting room, owing to the dining room being exposed on the north side, having a large window area, two doors opening into it, and also having a fireplace with an open flue. The cubical contents may be taken as being the same as the sitting room, 1,512 cub. ft., so that we get 1,512 × 0·2 × 1·5 × 30 = 1,360·8 B.T.U.'s infiltration loss per hour, 1½ air changes per hour having been allowed for. The exposed wall area is 21 × 9 = 189 sq. ft.; the total window area is 68·8 or, say, 69 sq. ft.; deducting 69 from 189 we get a net wall area of 120 sq. ft.; then 120 × 0·35 × 30 = 1,260 B.T.U.'s total transmission loss through walls per hour. There are three windows, two measuring 5 ft. 6 in. × 4 ft. 6 in., the other measuring 5 ft. 6 in. × 3 ft. 6 in., making a total window area of 69 sq. ft., then 69 × 1·03 × 30 = 2132 B.T.U.'s total transmission loss through windows per hour; adding the three results together, we get 1 360·8, or, say, 1 361+1 260+ 2,132 = 4,753 B.T.U.'s, which is the total heat loss per hour from all sources (ignoring the flue). To compensate for the northern exposure, the two doorways (opposite each other), and the open chimney, 20 per cent. is added to the radiation, the total working out as follows:— 4,753 ÷ 144 = 33 + 20 per cent. = 39·6 sq. ft. of radiation required.

Some engineers would advise that 25 per cent. be added to the radiation in the dining room, instead of the 20 per cent. we have allowed; this is a matter that depends upon the conditions that have to be dealt with, and concerning which an engineer must use his judgment. It would be preferable to warm this room by means of two radiators, rather than by one larger one.

For the purpose of making the foregoing calculations a temperature of 30 deg. F. outside the building and 60 deg. F. inside has been assumed. The questions arise: Is a temperature of 60 deg. F. sufficiently high in rooms where people are sitting, and are not making active movements? Would a temperature of 65 deg. F. be preferable? In America the temperature that is found to be most favourable to health in domestic life is 70 deg. F.; in industrial life, the temperatures found to be most beneficial to the health of the workers and to give the highest labour output, are as follows:—70 deg. F. in offices and factories where the employees are seated whilst at work; 60 to 65 deg. F. in factories where the employees are not engaged in sedentary occupation.

Whatever internal temperature may be decided upon, it is an easy matter to find the correct amount of radiation necessary by making use of the B.T.U. method when working out the calculations.

It may be of interest to point out that the "short cut" rule used by the engineer mentioned at the beginning of this article would give 18 sq. ft. of radiation as being necessary to warm the sitting room, and (the cubical contents being the same) a similar amount for the dining room; if we add 15 per cent. in the case of this room because of the northern exposure, this would bring the total radiation required up to 21 sq. ft., so that we have 18 and 21 sq. ft. respectively, given by the "short cut" rule against 33 and 39·6 sq. ft. respectively, given by the B.T.U. method of calculating. These examples will serve to show how misleading "short cuts" rules may be under various conditions.

A similar procedure would be followed in calculating the radiation necessary to warm the hall, drawing room, and the kitchen. In the case of the hall, which has a doorway communicating with the outside air, and a landing above, a very liberal amount of radiation should be allowed. Enquiries should be made concerning the cooking arrangements in the kitchen; if the food is to be cooked by a gas cooking stove, the full amount of radiation will be needed in cold weather; but if the cooking is done by a range burning coal, the heat given out by the fire should be taken into account when estimating the amount of radiation necessary. Bathrooms may with advan-

(Continued on p. 506)

CENTRAL HEATING

To Architects, Builders, Domestic Engineers, and the Public generally

A short book upon new ideas in Central Heating has been prepared. Copies on application to GRAHAM SQUIERS, Secretary, Copper and Brass Extended Uses Council, 115, COLMORE ROW, BIRMINGHAM.

LEGAL SECTION.

NOTES ON CURRENT CASES

Landlord and Tenant: Statute of Limitation.

MATTERS of family arrangement sometimes give rise to difficult questions of law, and the recent case, Nicholson *v.* England (1926, 2 K.B. 93), affords an example of this and decides an important question under the Real Property Limitation Act, 1833. The facts are voluminous, but may be stated shortly as follows. A Mr. and Mrs. Nicholson had a daughter who was about to be married and she asked her father to buy a house for her. Mr. Nicholson talked the matter over with his wife and the evidence was that, as they thought the house would be suitable for them to retire to when Mr. Nicholson gave up business, the house was purchased on April 4, 1909, and the daughter was married and went into occupation, the arrangement being that she should pay rent of £17 a year, but she should not be pressed for it, this being half the interest on a sum of £700 which Mr. Nicholson had borrowed from his bank in order to make the purchase. Mr. Nicholson said he had never asked for or received any rent in respect of the house, but had told his wife she could keep any rent she received and delegated the collection to her. In 1921 Mr. Nicholson's first wife died, and in 1923 he had married his second wife (the present plaintiff), and in 1924, by an indenture, he had made a deed of gift to his second wife of the house and garden and £138 arrears of rent.

In March, 1925, the second wife commenced an action for possession of the house and the arrears of rent, and in this action the question was raised as to whether any rent had been paid at all, as the defendant set up the Statute of Limitation as barring the claim.

There was some conflict of evidence about this. The plaintiff relied upon two entries in an account book of the first wife showing payments of sums of £8 10s. in 1911 and 1913, but the defendant denied that these were payments in respect of rent, and the County Court judge had held that there was not sufficient evidence to show that the second of these payments, which alone was material as being within the statutory time, had been paid as rent. The plaintiff also relied upon a payment made by his daughter to Mr. Nicholson six weeks after the statutory period of thirteen years had run. The defendant denied that this had been a payment in respect of rent, but alleged it was a repayment of other loans made to her by her father; but Mr. Nicholson, whose evidence was accepted, said that the payments she referred to as loans were gifts, and that this payment of £100 had been made by his daughter as repayment of some of the rent.

The only questions raised on this appeal were: (1) Whether if this tenancy was a tenancy at will this payment of £100 revived the tenancy, or whether it was statute barred; and (2) whether if this was a tenancy from year to year this payment would suffice to prevent the operation of the statute.

The Divisional Court held that this was a tenancy at will, but also gave an alternative judgment on the basis that it was a tenancy from year to year. Before referring to the judgments we must refer to the statute. The time limit within which such actions become barred, as fixed by section 2 of the Real Property Limitation Act, 1833, was amended by section 1 of the Real Property Limitation Act, 1874, and is twelve years next after the time at which the right to make entry or distress, or to bring an action or suit, shall have first accrued to some person through whom the plaintiff claims, or, if the right shall not have accrued to any person through whom he claims, then within twelve years next after the right first accrued to the plaintiff.

Section 7 of the Real Property Limitation Act defines what is meant by the term "first accrued" in the case of tenancies at will, whilst section 8 does the same as regards tenancies from year to year. Section 7 enacts that the right shall be deemed to have first accrued either at the determination of such tenancy or at the expiration of one year next after the commencement of such tenancy, at which time such tenancy shall be deemed to have determined. Section 8, which applies to tenancies from year to year or other period without any lease in writing, enacts that the right shall be deemed to have first accrued at the determination of the first of such years or other periods or at the last time when any rent payable in respect of such tenancy shall have been received, which shall last happen.

As regards the tenancy at will the Court held that this payment of £100 made more than 13 years after the right had accrued to the plaintiff could not revive a tenancy which "was dead and gone," following the opinion expressed by Jessel, M.R., in Sandars *v.* Sandars (19 Ch. Div. 373), that when a title has been extinguished by the statute no mere acknowledgment by the person who has acquired under the statute as good a title as if a conveyance had been made to him can restore the old title. Then if the tenancy was treated as a tenancy from year to year the Court held that, as section 34 of the Act provides that "at the determination of the period limited by this Act to any person . . . for bringing any action or suit, the right and title of such person to the land rent or advowson . . . shall be extinguished," the words in section 8, "or at the last time when any rent payable in respect of such tenancy shall have been received," must refer to an existing tenancy, whereas here the payment relied upon had been made after the termination of the statutory period and when, as was shown by section 34, the tenancy had been extinguished. In coming to this conclusion the Court was not following an old case, Bunting *v.* Sargent (1879, 13 Ch. D. 330), which it indicated had never been followed in any subsequent action and which appeared inconsistent with dicta in Sandars *v.* Sandars (*ubi sup*), to the effect that no payment after the period had run would revive a title unless it was continued for such a period as to give a new statutory title.

Thus the plaintiff failed in her action.

Costs in Actions where an Account is Taken.

As in actions arising on building contracts it is very generally the practice to order an account to be taken to ascertain the amount due under the judgment, we may refer our readers to a case where a difficulty occurred as regards the order made by the judge, and where the practice is now laid down as to costs.

The case is Light *v.* William West & Sons, Ltd. (1926, 2 K.B. 238), and the action was brought by an agent for wrongful dismissal, in which the plaintiff alleged that he had been prevented from earning certain allowances and commissions, but the defendants alleged that certain conditions attaching to the plaintiff's employment had not been fulfilled, and counterclaimed for certain sums due from the plaintiff in respect of goods supplied to him.

The trial lasted several days, and the Court then made the following order: "That judgment be entered for the plaintiff for an amount to be ascertained (if not agreed) by a referee to be agreed between the parties, such account to be taken up to and including August 31, 1923, with costs of the action the counterclaim dismissed with costs. It is this day adjudged that the plaintiff recover from the defendants the amount ascertained (if not agreed) by referee, as above directed, and costs to be taxed, including the costs of the counterclaim." The order was sealed April 17, 1925.

The parties being unable to agree as to the amount, agreed to refer the matter to a Master of the Court, who took the account and certified that the amount ascertained was £83 10s. Pursuant to that certificate, on November 29, 1925, the Master endorsed the following endorsement on the order: "And the Master by his finding filed the 2nd day of December, 1925" (this was the day appearing in the order as entered and completed), "having certified the amount at £83 10s., it is this day adjudged that the plaintiff recover from the defendants £83 10s. and costs to be taxed."

On the day following that on which the endorsement was actually made, and before the final entry—that is to say, on November 30—the plaintiff applied to the judge who had tried the action for costs on the High Court scale. This was rendered necessary by section 11 of the County Courts Act, 1919, for the sum recovered being less than £100, unless the judge certifies that there was sufficient reason for bringing the action in the High Court, the plaintiff is only entitled to costs on the County Court scale. On this application the defendants contended that the judge, having in the first instance given an unqualified order for costs, had exhausted his jurisdiction and was *functus officio*. The learned judge overruled this contention on two grounds: (1) That the proper order should have contained the words "with leave to apply," but these could be implied; and (2) if that was not so, yet under Order xxviii, Rule 11, of the Rules of the Supreme Court, this could be treated as an accidental omission.

The case on this point was taken to the Court of Appeal, and that Court held that although the matter could hardly be treated as a slip or accidental omission, yet until final judgment is entered there is jurisdiction in the judge to make the order, for until the damages are ascertained the proviso to section 11 of the County Court Act, 1919, does not come into operation, and therefore the power to order High Court costs cannot be made. The Court pointed out that the difficulty in this case arose from a mistaken procedure, as the learned judge had given judgment for the plaintiff with the costs of the action before the result of the account to be taken was known and the right course would have been to have reserved the costs with "liberty to apply."

This is a point worth noting in cases where an account or reference is ordered for interlocutory applications such as the above in which an appeal to the Court of Appeal considerably adds to the cost of litigation, and the correct practice is now definitely prescribed by the Court of Appeal.

Fortunately, also, in this case the application was made before the formal entry of the final judgment, for Lord Justice Sargant in his judgment intimated that had the final judgment been entered he could not say what would have happened.

Landlord and Tenant: Latent Defects.

In our issue, June 4, we commented upon a case, Fisher *v.* Walters—a case which turned upon sections 14 and 15 of the Housing Act, 1909—but we were unable to explain the judgments delivered by the Divisional Court, as at that date the case was only reported in a head ote. It is now fully reported (1926, 2 K.B. 315), and we may add a note to our former comment. The plaintiff was tenant of a house within the Act, and he brought an action against the landlord for the fall of a ceiling. In 1912 a portion of the ceiling had fallen, but had been repaired by the landlord, and no further fall had occurred until October, 1925, and it was not disputed that the defect could not have been discovered by ordinary examination as distinguished from thorough examination by an expert; thus, so far as the tenant was concerned it was a latent defect. Mr. Justice Finlay in his judgment intimated that it would be impossible to hold in these circumstances that under section 14 the house was not reasonably fit for human habitation at the commencement of the tenancy, thus the decision was based entirely on section 15, which provides that "the last foregoing section shall, as respects contracts to which that section applies, take effect as if the condition

implied by that section included an undertaking that the house shall during the holding be kept by the landlord in all respects reasonably fit for human habitation."

The landlord contended that this section placed the same degree of liability upon him as would be the case under a covenant in a lease—that is to say he would be under no liability in the absence of notice of want of repair.

The Divisional Court pointed out that this principle contended for was confi ed according to the decided cases to patent defects, with one exception, the case of Hugall *v.* McLean (53 L.T. 94), and this case was the subject of comment in Murphey *v.* Hurley (1922, A.C. 369), where Lord Sumner pointed out that it appeared the Court deciding it felt it was carrying the rule to the extreme limit.

The Divisional Court distinguished the present case from Hugall *v.* McLean on the ground that that case turned on the terms of a covenant in a lease to keep the drains in repair, but in the lease there was no covenant enabling the landlord to enter the premises for inspection, whereas section 15 of the Housing Act, 1909, in subsection (2) contains powers for the landlord to view the premises. The Court therefore held that in a case of latent defect under the statute it would be carrying the extreme case of Hugall *v.* McLean further still if it held that the tenant must give notice of a latent defect, but pointed out that their decision did not cover a patent defect where different considerations would arise.

NEW UNIVERSITY BUILDINGS, PARIS

The Prince of Wales will open, next month, a Canadian Pavilion in the Cité Universitaire of Paris. From the architectural point of view the architect of the Cité, M. L. Bechmann, had an exceptional opportunity when he was invited after the war to plan out a residential hostel, suitable for the accommodation of 300 students, men and women, and owing to the generosity of M. Emile Deutsche de la Meurthe, knew that he could rely on a fund of ten million gold francs as a first instalment. He was also given an exceptionally fine site on part of the old fortifications of the city of Paris with a frontage of 700 metres along the Boulevard Jourdan, and opposite the picturesque park of Montsouris, with a view looking over the left bank of the River Seine.

The buildings were opened last year, and although the whole conception has not yet materialised, the illustrations will show that the architect has attempted to transfer the atmosphere of an Oxford or Cambridge College from Great Britain, adding the distinctive features of Normandy architecture. The buildings provide accommodation f r superior to any enjoyed by Paris students of former days. Opposite to the main entrance is the Great Hall, where concerts and dances are held, with reading room and a gymnasium attached. On the other side of the main square is the restaurant, where both men and women students can obtain their dejeuner or dinner at exceptionally low prices. On the other two sides there are four pavilions, two for women and two for men, and also a house for the directing staff.

The rooms are large. Each man has a writing-desk, a bookcase, two chairs and a bed that can be converted into a settee during the day. A wash-basin with hot and cold water is provided in a separate small room for every girl student, but there is only cold water for the men. Special attention has been paid to interior decoration, so that each room should have a different aspect. Fourteen different kinds of wall-paper have been adopted, and the curtains and hangings of the beds are of shades that do not clash with the paper.

A scheme is on foot for building on the same site a hostel for American students now in Paris.

ARCHITECTS' & BUILDERS' INQUIRY BUREAU

We are glad to give questions and answers, but cannot accept responsibility for contributed replies, especially on legal matters.

May we appeal to our correspondents to submit their queries on paper of a size easily filed, and written as legibly as possible, or, better still, in typewriting?—ED.

Remedying Defects to House.

[REPLY TO "PERPLEXED," SEPTEMBER 3.]

SIR,—The clause in the agreement which your correspondent quotes makes it perfectly clear that the vendor has undertaken to make good any latent defects that appear within the specified period. Whether or not the vendor is protected against his contractor is not the concern of the purchaser. He has simply to call upon the vendor to carry out the terms of his contract or take the usual legal remedies to force him to do so. Latent defects would be those not apparent at the time of purchase, but making their appearance since that time, and I should consider all those mentioned by your correspondent would come under that head. LEX.

Roman Stone.

[REPLY TO "INTERESTED," SEPTEMBER 10.]

SIR,—This stone comes from the Trieste neighbourhood of Italy, previously Austrian territory before the war. The stone is very similar in texture and nature to Hopton Wood, but with a rather less handsome figure.

DERBY.

Turning Space for Cars.

[REPLY TO "PLANNER," SEPTEMBER 10.]

SIR,—For comfortable turning space, allow a radius of not less than 40 ft. diameter.

PLENTY.

SIR,—A diameter of from 60 to 70 ft. is desirable for turning space to permit of a Rolls-Royce or other similar large car turning comfortably in one lock.

W. G. W.

Construction of Water Shoot.

[REPLY TO "SPORT," SEPTEMBER 10.]

SIR,—Teak is the best material for the construction of such a chute. The wood should be particularly well seasoned, and although absence of joints is in many ways desirable, it is best to have the bottom made up out of a number of narrow widths and permanently cramped together at the back, otherwise splitting is likely. The sides should have the top edges well rounded. The whole must be well rubbed down to a perfect surface, and good and frequent waxing will prolong its life and keep it in comfortable condition. Opinions vary as to the desirable inclination, but generally 45 deg. would be the greatest slope, and that only over deep water, while 35 to 40 deg. will give general satisfaction, particularly over fairly shallow water. The chute should be not less than 24 in. wide between the upstanding sides. A spray pipe for running water should be provided at the top.

CHANNEL.

SIR,—The inclination of the shoot should be 30 deg. with the horizontal, its length should not be less than 10 ft., and provision must be made at upper end of same for flooding evenly with a very thin sheet of water. Any reasonably hard wood that is not liable to splinter may be used. The width of plank should be about 21 in. to 24 in.

W. G. W.

Fall of Drains.

[REPLY TO "CUTTING IT FINE," AUGUST 27.]

SIR,—In a somewhat similar difficulty within my own experience, the problem was solved by putting down a 9 in. pipe at an inclination of 1/200 and providing an automatic flushing cistern at head of drain operated by waste from a large bath-house. The cistern should be of such size as to discharge, every six hours or so, a volume sufficient thoroughly to flush out the pipe. Provision was made for supplying the cistern with water from main during such periods as the bath-house was out of use.

W. G. W.

Plaster Slabs.

[REPLY TO MR. P. HIGGINS, SEPTEMBER 10.]

SIR,—A mix of 1 part Portland cement, two parts clean pit sand, and three parts coke breeze crushed to pass a 1½ in. ring, well mixed, will make good slabs for internal work. Mix as dry as possible to avoid distortion and uneven thicknesses when setting.

CONCRETE.

Reinforcement to Concrete Cottage.

[REPLY TO "RED ROSE," SEPTEMBER 17.]

SIR,—With regard to the last portion of the query as to fencing the public footpath, there is no "legal distance from between fences required to satisfy the law." If the right of way is acquired by user, the extent of the right must be measured by the extent of the user, and it may be of any width. If, of course, there exists any evidence of fences or dykes on either side of the way, then it may be said that the public right of passage extends to the whole space between the fences. Otherwise the width is a question of fact, to be determined on the best evidence to be obtained from maps or plans, or those having knowledge of the extent of the user. Across an open space or field, when the way is not defined, a strip of reasonable width (having regard to whether the right be a footway or carriage-way), running straight from terminus to terminus, is all that can be claimed.

LAW.

School Drainage.

[REPLY TO "BUILDER," SEPTEMBER 17.]

SIR,—All privately-owned preparatory schools are liable to inspection in certain cases. Under the Public Health Act, 1875, a house includes a school, and under Section 41 of the Act, on the written application of any person to the local authority, stating that any drain on or belonging to any premises within their district is a nuisance, or injurious to health, it may cause it to be examined. Further, under Section 45 of the Public Health Act, 1907, the local authority may obtain additional powers for the testing of drains. "Builder" should obtain the by-laws of the local authority concerned, made under Section 157 of the 1875 Act, which will give him all detailed information he requires as to the new drainage of buildings—method of laying, materials, &c. If he submits a block plan, showing the drainage therein in accordance with the forms and information to be obtained from the local authority in respect thereto, and it is approved, he will receive particulars of the times when notices are to be given to the local authority for the inspection of the new work and the nature of the tests that will be applied to it. If he satisfies the local authority as to the work done, he should, at the same time, fully satisfy and safeguard his clients' interests.

LAW.

Compressed Lime.

SIR,—Can you tell me where I can obtain compressed lime? Years ago this was used in many cases instead of blasting old walls, &c., especially in dock work and where it was inadvisable to use explosives; but of late years the material seems to have died out.

F. H. WINTER.

Coloured Inserts in School Playgrounds.

SIR,—I should be glad of any information as to the materials used for laying different coloured lines in school playgrounds which are to be resurfaced in tarred macadam.

JANUS.

Main Drainage.

[REPLY TO "BLUE BELL," SEPTEMBER 10].

SIR,—In most districts, provided the main drain passes within a certain specified distance of any house, the owners of the latter may be called upon by the local authority to supersede any existing arrangements for sewage disposal, and connect up to the main drain. GOOD JOB.

THE BUILDING TRADE

BUILDING CONTRACTS

By W. T. CRESWELL, Barrister-at-Law; Lic.R.I.B.A.; Associate (late Fellow) Surveyors' Institution; Author of "The Law Relating to Building and Building Contracts."

ENTIRE OR LUMP-SUM CONTRACTS.—(II.)

The Provision of Bills of Quantities.

BEFORE anyone nowadays proposes to build, he should be informed of the probable cost of his enterprise; to this end bills of quantities are prepared which enable contractors to send in competition tenders on an identical basis before the contract is let to one of them finally. These same bills also afford a convenient schedule of prices on which variations may be measured and valued; and, indeed, extras and omissions of any magnitude also, if there is an express clause inserted in the contract providing that these shall be charged at the prices in the bills of quantities, or prices analogous to the items therein.

The Employment of a Quantity Surveyor.

The quantity surveyor employed to prepare the bills of quantities should invariably be an independent person, and in no case is it advisable that the architect for the work should "take out his own quantities." His services should be retained to check the efficiency and accuracy of the pricing and extension of the quantities returned by the tenderer, before a building contract is entered into. It is of advantage that the quantity surveyor be further employed to adjust any variations of the contract on final adjustments of accounts.

It used to be the custom for a quantity surveyor to be appointed by the architect, but even so this condition of his employment was that the contractor should pay direct to him his charges and expenses. Usually such payment was to be made after the first interim payment under the contract to the contractors, the contractor at the outset adding the amount of the quantity surveyor's charges to the amount of his tender; so that, in reality, the charges were borne by the employer coming through the contractor's hands merely as a convenient channel. So much so, that in Priestly *v.* Stone (1888, 4 T.L.R. 730, C.A.) it was held that a quantity surveyor was not liable to the contractor for any error or discrepancy in the bills of quantities since there was no privity of contract between them.

Now, however, it is becoming the practice for the quantity surveyor to be appointed by the employer or his architect acting definitely in this matter also as his agent; and in these circumstances if the bills of quantities are made part of the contract, whatever be the channel of his payment, if the quantity surveyor does not use reasonable skill and care in their preparation he renders himself liable to the employer in an action for negligence. It is all to the advantage of the contractor that this should be so, for he has no voice in the choice of the quantity surveyor, and often does not have any direct contact with him, and by this procedure he is entitled to take the bills of quantities as reasonably correct; and in the event of their accuracy being questioned or found faulty—there being no privity of contract between him and the quantity surveyor—the contractor's remedy for such inaccuracy is against the employer, since the latter is responsible for the action of his quantity surveyor. The employer in turn must recover from the quantity surveyor for lack of skill and carelessness if he seeks such a remedy.

Accuracy of the Bills of Quantities.

In custom there is no warranty that the bills of quantities are accurate. In Scrivener *v.* Pask (1866, L.R. 1, C.P. 715) the architect prepared the quantities for the work and represented to the contractor that they were correct, and the latter then made a tender which was accepted. Eventually the quantities proved to be incorrect, and the contractor had to provide more labour and materials than he had allowed for. It was held that there was no evidence that the architect acted as the employer's agent in taking out the quantities, or that the employer had guaranteed their accuracy, and that the contractor could not recover more than the contract price.

On the other hand, the contractor tendering is, it is true at his own risk, entitled to assume the correctness of the bills of quantities as being the honest estimate of a skilled person, viz., the quantity surveyor; and he is under no obligation, if eventually their inaccuracy in any item or items results in a gain to himself, to have checked their accuracy before entering into a binding contract.

In Neill *v.* Midland Rly. Co. (1869, 20 L.T. 864) the plaintiff agreed to execute works for a gross sum, and there was a schedule of quantities in which he had set out the items making up the gross sum. Before the completion of the work he discovered errors in calculation in the schedule, and filed a bill on which he sought to have them rectified, alleging that they were known to the defendants at the date of the contract or soon afterwards. The defendants demurred to the bill for want of equity, but were overruled and rectification granted.

In Ford *v.* Bemrose (1902, 18 T.L.R. 443) it was suggested that there was a *general usage* in the building trade that when tenders were invited for the erection of works in accordance with plans, and a bill of quantities was provided therewith, a person making a tender was entitled to assume the correctness of the quantities, and if the labour and materials involved in the actual construction proved to be greater or less than those taken in the actual quantities, it was customary for the price to be reduced or increased accordingly. It was held that bills of quantities were merely an *estimate*, and did not amount to a *warranty* by the building owner that the items therein were correct; and that the builder was entitled to be paid the fixed lump sum, neither less nor more, for the work done; and that the custom alleged contradicted the contract and could not be relied upon.

In Page *v.* Taunton U.D.C. (1904, referred to on p. 203 H.B.C.) the plaintiff contracted for the entire construction of sewerage works, not at a lump-sum price, but at a price at so much per yard or foot, &c., for different classes of work; and on filling up the schedule of prices he put £18 per cwt. for cast iron pipes which should have been priced at 18s. per cwt. After a considerable amount of the work had been done the engineer for the council brought the matter to his council, whereupon he tried to force the plaintiff to do the work at the lower price; and on the plaintiff refusing, the council instructed its engineer to order as little as possible of this particular work. On completion of the works plaintiff sued for (*inter alia*) the difference between the 18s. per cwt. which he had been paid, and the £18 per cwt. the price in the schedule. It was held that cross-examination of the plaintiff as to the value of the cast iron pipes, which he admitted he could have bought for 12s. per cwt., was irrelevant on the ground that the contract was in writing, and unambiguous, and that it was in any case too late for defendants to seek to rectify the contract they having also definitely affirmed the contract by instructing the engineer to order as little as he could of this particular work as an express measure.

The question naturally arises as to what would have happened had the order last referred to in the case not been given and the contractor had provided a large quantity of the iron pipes at £18 per cwt.—how would the Court have dealt with it? To keep to the contract would appear to be iniquitous, to set it aside illegal. It should not be overlooked that the contractor presumably gained the contract in competition with others, so that it may be inferred that the council stood to gain on the other prices in the schedule of prices; also, that if the price for the iron pipes had been 18d. per cwt, the contractor could have been held to that price.

Errors and Omissions in the Bills of Quantities where they form part of the Contract.

It is now usual and the fairest course to take, for an "errors and omissions" clause to be inserted in all contracts. Such an one appears in the R.I.B.A. Schedule of Conditions of Contract, where the bills of quantities form part of the contract; and it provides that the rectification of errors and omissions may be treated as variations of the contract; but all errors made by the contractor in his prices and calculations, extensions, &c., are excepted from such rectification. Such errors and omissions are not only those as between the drawings and the bills of quantities, but such as crop up in carrying out the work.

It might be of advantage to limit the time within which such rectification should be allowed; but when that is not done, it appears that rectification for any error or omission can be claimed until the accounts are finally adjusted.

In adjusting errors and omissions in the bills of quantities as variations on the contract, the question always arises as to whether the surveyor is entitled to omit *all* the work in connection with any item originally taken in the bills of quantities; and it has been suggested by a well-known quantity surveyor that, as a rule, if an item is wrong in *one* dimension or description only, the resulting difference *only* should be measured; but that if more than one dimension is wrong, the item should be entirely remeasured. Be all this as it may, any attempt to convert a lump-sum contract for which the bills of quantities form part, into a measurement contract, *i.e.*, entirely to throw over the original agreement, and to substitute measurement as the method of determining the amount to be paid for the work when no such intention is clearly indicated in the contract should be resisted at all stages. For such a contract is undivisible when the consideration is one and entire; and in entering into such a contract the intentions of the parties must be clearly defined and are to prevail; those intentions being, that the bills of quantities should be reasonably correct and expert measurements on which the contractor has to rely in buying his materials, and entering into any sub-contracts.

Further, if provision is made in the contract whereby the architect on detecting an error during the course of the work may in writing cancel, for instance, an error in excess by a variation order, and treat it as an omission in the contract, then such order should manifestly be in the hands of the contractor before he has incurred any expense in preparing to carry out the item as taken off.

Building Regulations Order.

The Secretary of State has issued an order making operative the "Building Regulations" of June 21st, 1926, as from October 1. These Regulations include (paragraph 47), "The installation of First Aid Cases to a given specification on all premises where machinery worked by motor, water, or other mechanical power is temporarily used for the purpose of the construction of the building, or for the purpose of any addition to the structure of the existing building," and if supplied after October 1, such cases shall be plainly marked with a white cross on a red ground.

Builder's Estate.

Mr. Thomas Simister, of Macclesfield, builder and contractor (late chairman of Messrs. George Roylance & Co., Ltd.), left £13,388.

TRADE NEWS

Art and Publicity.

Our advertisement pages provide ample evidence of the great advances that have been made in the presentment of commercial announcements, and we note with interest that an advertisement published in our issue of September 17 has been selected for inclusion in the Autumn Number of *The Studio* to represent the level of achievement in building trades advertising. This advertisement of Kerner-Greenwood & Co., Ltd., relating to their "Pudlo" brand cement waterproofer, is illustrated by A. Michael Fletcher, A.R.C.A. Some other of their advertisement drawings, by Walter Keesey, A.R.C.A., A.R.I.B.A., Leonard Squirrell, R.E., and Miss Cafferata, whose work has been presented to readers of our advertisement pages, are also reproduced in the same issue.

Testing Machine for Steelwork.

Messrs. Dorman, Long & Co. are erecting at Middlesbrough what is claimed to be the largest universal testing machine in the world, built by W. & T. Avery & Co., Ltd., in connection with the former firm's contract for the construction of the Sydney Harbour Bridge. The machine is capable of carrying out tensile, compressive, and transverse bending tests on built-up structural members at loads up to a maximum of 1,250 tons. A built-up compression member 50 ft. in length, and having a cross-section 45 in. square, can be inserted and tested to destruction. Complete lattice girders can be subjected to a transverse test, the accommodation for which permits of a girder 42 in. in width being tested upon a span of 20 ft.

The New Torquay Hospital.

The Beer Stone Co., Ltd., of Seaton, Devon are the contractors for the masonry of the new Torbay Hospital which, through the munificence of Mrs. Rowcroft, is being erected at a cost of £120,000 in Torquay. The company, which is now under the sole control of Mr. E. Terrell, who first entered the firm as a junior clerk in 1881, also supplied much of the stone used in Exeter Cathedral, while the contracts for the Electric Light new premises in Knightsbridge, W., and for many of the West Country branches of Barclays and Lloyds Banks were also awarded to them.

Builders' Materials Price List.

We have received from Messrs. H. & C. Davis & Co., Ltd., of 1, The Pavement, Clapham Common, S.W.4, copies of their illustrated net pocket price lists for wholesale builders' materials and electrical accessories. Both lists are very handy and give a comprehensive idea of the great stock of good class fittings and materials carried by the firm.

"Devon" Fires.

An attractive catalogue has reached us from Messrs. Candy & Co., Ltd., of Oxford-street, W., and Newton Abbot, the manufacturers of the "Devon" fire. The fire lends a dignified yet cheery tone to any room, and it has been placed first in official tests carried out at the Government offices jointly by H.M. Office of Works and the Smoke Abatement Society. In addition to illustrations of various types, the catalogue, which is illustrated in colour, gives much useful information on the fixing and other features of the "Devon" fires, which have been installed at many public buildings and hospitals, among them being Guy's Hospital, the British Museum, and Lady Margaret Hall, Oxford.

Suggested Demolition of Hay Market.

The London County Council has decided to apply to Parliament, in the session of 1927, for authority to purchase and abolish the Hay Market and to prohibit street traders from using the part of Whitechapel High-street between Mansell-street and Leman-street, and ask whether, in the event of powers being obtained, the Corporation will be prepared to contribute towards the cost of the improvement.

NEW BUILDINGS IN LONDON

Plumstead. — REBUILDING. — The Royal Arsenal Co-operative Society of Woolwich have purchased property in Plumstead High-street. The existing shops are being pulled down and new ones erected. Mr. S. W. Ackroyd, of the Architects' Department, has prepared the plans. The work is being carried out by the Works Department.

Balham High-road. — REBUILDING. — The Royal Arsenal Co-operative Society Works Department are carrying out a rebuilding scheme in Balham High-road. The work consists of new shops for their own Society. Mr. S. W. Ackroyd, of the Architects' Department, 148, Powis-street, Woolwich, has prepared the plans.

Bethnal Green.—HOUSING.—The Mayor has laid a commemoration stone in connection with the Parmiter-street housing scheme of the Bethnal Green Council. The Council has spent close upon a quarter of a million pounds in building between 180 and 190 dwellings, all of which are up to date and contain all the latest labour-saving devices. The new houses will not be ready for six months.

Charing Cross.—HOSPITAL.—A public appeal for £100,000 is about to be launched by Charing Cross Hospital. The governors have been presented with the opportunity of acquiring the whole of the island site on which the hospital stands, and which is bounded by King William-street, Chandos-street, and Agar-street.

Earlsfield.—PREMISES.—A vacant site in Garrett-lane, S.W., has been obtained by the Royal Arsenal Co-operative Society of Woolwich for the erection of new premises. The plans are by Mr. S. W. Ackroyd, of the Architects' Department, and the Works Department are carrying out the job.

Stratford.—SHOWROOMS.—Messrs. A. E. Symes, of Stratford, are erecting a store and showrooms for the furnishing department of the Co-operative Wholesale Society, at Falmouth-street, Stratford. Mr. L. G. Ekins, architect, C.W.S., Leman-street, E.1. Cost of the work is about £10,000.

Architects' and Builders' Board.

The Joint Consultation Board, consisting of four representatives each of the R.I.B.A. and the National Federation of Building Trades' Operatives, established with the object of considering such questions as education, apprenticeship systems, means for stimulating a revival of craftsmanship and awakening the interest of workmen in the design of buildings upon which they are engaged, "wet time," and cognate matters (apart from the question of wage rates), has been appointed as follows:—

Royal Institute of British Architects: Mr. H. V. Ashley, Major Harry Barnes, Mr. Arthur Keen, and Mr. Herbert A. Welch. National Federation of Building Trades' Operatives: Mr. Thomas Barron, Mr. George Elmer, Mr. S. Sigsworth, and Mr. R. Coppock.

Similar steps are being taken in various provincial centres where allied societies of the R.I.B.A. are arranging to keep themselves in touch with the operatives in the building trade. One of the objects of the movement, the arousing of the interest of the workman in the job upon which he is engaged, is also being furthered by a course of lectures, which will be given at the R.I.B.A., 9, Conduit-street, W. 1.

Fleet-street Week for Bart.'s.

This year's "Week," from October 10 to 17, promises materially to assist the City's hospital. A flag day, ladies' collecting day, a bazaar and concert at the Mansion House and Kingsway Hall respectively, and other amusements ranging from a novel "treasure hunt" to a boxing match at the Stadium Club, Holborn, between teams representing the Stock Exchange and Belsize B.C.'s and the United Hospitals B.C., are features of the week's programme designed to raise £20,000 for Bart.'s. Lord Stanmore is chairman of the organising committee.

HEATING AND VENTILATION.

(*Continued from p. 502.*)

tage be warmed to about 70 deg. F., or even 5 deg. higher, whenever the cost of the extra radiation necessary can be met.

Add 10 per cent. extra radiation for prevailing winds during the winter.

As direct-indirect or ventilating radiators, and especially indirect radiators, give out considerably more B.T.U.'s per sq. ft. of surface than do direct radiators, arrangements must be made to supply the extra heat necessary whenever direct-indirect or indirect radiators are connected to an installation; if the makers of the radiators are consulted, they will supply any data or particulars concerning them that may be necessary.

In cases where concealed radiation is installed, such as a radiator placed under a shelf, with or without a grille in same, and with a covering to the front and sides of the radiator, it is necessary to add from 10 to 20 per cent. to the amount that would be required if the radiator were quite exposed (direct radiation). Low radiators (window type) that are covered with seats must have from 20 to 25 per cent. more radiating surface than would be required if they were without the seats; with very close seats a still greater percentage must be added.

WARMING THE SMALL HOUSE

BY W. W. WOOD, A.R.I.B.A.

THE suburban home is commonly thought to be incomplete without the cheery open fire in every living room. Cooking is done by gas or electricity. Radiators are looked upon with suspicion, and a frequently unjustifiable bias exists against them. Therefore, an economically designed stove is required, economical from the standpoints of fuel consumption and also direct and indirect labour. A raised hearth, a sunk fire with the necessary draught cunningly introduced under the trivet—or rather the removable plate which nowadays replaces the old-fashioned trivet—raised about half-an-inch above the hearth, meets all these requirements.

To carry coal up to a bedroom is dirty and quite unnecessary hard work, yet warmth is occasionally needed, usually because someone is ill, and so cleanliness is highly desirable. Again, it is a great consolation to have a little genial warmth on a cold winter's morning, when dressing becomes less of an ordeal; and, too, in the evening, before dinner; and, again, when retiring. Nothing is so handy in this respect as a gas fire. Until quite recently, gas fires have been ugly affairs, but now, with a little persistence, quite excellent designs can be found. Some day we may even be able to buy them in shades other than black, without paying a greatly enhanced price.

Adequate hot-water supplies are ensured by the use of a small independent boiler, provided the lay-out is piped on the circulating principle and the sizes of everything are scientifically worked out by a competent heating engineer.

In the case of the small house in the country, where there is neither gas nor electricity, if there is no objection to radiators, it will be extremely difficult to improve upon the combined services of a cooking and heating range. No doubt exists as to its efficiency for cooking, heating and hot-water supply, but a point to remember is that the calorifier should NOT be in the kitchen. The linen closet is the ideal place for it. Should this, however, be absolutely impossible, it, and all the pipework exposed in the kitchen should be effectively insulated with plastic asbestos, otherwise the apartment becomes insufferably hot, especially in summer. Summer, in fact, is a sore trial to any combined system and brings its limitations to the fore. Change-over valves on the hot-water supply primary flow and return pipes, connected to an independent boiler, put the combined system out of commission without interfering with the supplies of water, and hot foods can be cooked on an oil stove, effecting a great saving in bad temper from a sweated cook.

RATES OF WAGES IN THE BUILDING TRADE

Every endeavour is made to ensure accuracy, but we cannot be responsible for errors.

	Masons	Bricklayers.	Carpenters Joiners	Plasterers.	Slaters.	Plumbers.	Painters.	Labourer
Aberdare	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Accrington	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Alfreton	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Alnwick	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Altrincham	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Ashford (Kent)	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Ashington	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Ashton-under-Lyne	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Aylesbury	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Aylsham	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Banbury	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Barnsley	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Barnstaple	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Barrow-in-Furness	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Barry	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Basingstoke	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Bath	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Bedford	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Berwick	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Bexhill	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/1
Birkenhead	1/10	1/10	1/10	1/11	1/10	1/10	1/9½	1/4½
Birmingham	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Bishop Auckland	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Blackburn	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Blackpool	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Bolton	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Bournemouth	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Bradford	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Bradford-on-Avon	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/3½	1/0½
Braintree	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Brentwood	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Bridgwater	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/1
Bridlington	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Brighton	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Bristol	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Bromsgrove	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Bromyard	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0½
Bungay	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	11½
Burnley	1/8	1/8	2/8	1/8	1/8	1/8	1/8	1/3½
Burton-on-Trent	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Bury	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Buxton	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Cambridge	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Canterbury	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Cardiff	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Carlisle	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Chatham	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Chelmsford	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Cheltenham	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Chester	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Chesterfield	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Cirencester	1/5	1/5	1/5	1/5	1/5	1/5	1/4	1/1
Clacton	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Colchester	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Coventry	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Cranbrook	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	11½
Crewe	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Cromer	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Darlington	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Deal	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Denbigh	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Derby	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Devizes	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/3½	1/0½
Dewsbury	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Doncaster	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Dorchester	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/3½	1/0½
Dorking	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Dovercourt	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/1
Driffield	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Droitwich	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Dudley	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Durham	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Eastbourne	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
E. Glam.(Mon. Val)	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Ely	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Exeter	1/7	1/7	1/7	1/7	1/7	1/7	1/6	1/2½
Exmouth	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/1
Fakenham	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Felixstowe	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Folkestone	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Frome	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Glossop	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Gloucester	1/6	1/6	1/6	1/6	1/6	1/6	1/5	1/1½
Godalming	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/1
Goole	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Gosport	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Grantham	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Grays	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/7½	1/3½
Great Yarmouth	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Grimsby	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Guildford	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Halifax	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Harpenden	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Harrogate	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Hartlepools	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Harwich	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/1
Hastings	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Hatfield	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Hednesford	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Hereford	1/6	1/6	1/6	1/6	1/6	1/6	1/5	1/1½
Herne Bay	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Hertford	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Hitchin	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Hoddesdon	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Holt	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	11½
Huddersfield	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Hull	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Hunstanton	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Huntingdon	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/1
Isle of Wight	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0½
Ipswich	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Keighley	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Kettering	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Kidderminster	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
King's Lynn	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/1
Lancaster	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Leamington Spa	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Leeds	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Leicester	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Leighton Buzzard	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Lichfield	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Lincoln	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Littlehampton	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/1
Liverpool	1/10	1/10	1/10	1/11	1/10	1/10	1/9½	1/4½
Llandudno	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Llanelly	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
London:								
12 m. radius	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/8½	1/4½
12–15 m. radius	1/9	1/9	1/9	1/9	1/9	1/9	1/8	1/4
Loughborough	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Lowestoft	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Luton	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Macclesfield	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Maidstone	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Malvern	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Manchester	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Mansfield	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Margate	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Market Harb rough	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Matlock	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Melton Constable	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	11½
Melton Mowbray	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Merthyr Tydfil	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Middlesbrough	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Newark	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Newbury	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Newcastle-on-Tyne	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Newcastle-ur-Lyme	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
New Forest	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/1
Newmarket	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/1
Newport, Mon.	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Northampton	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Norwich	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Nottingham	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Nuneaton	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Oakham	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Oldham	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Oxford	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Paignton	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Peterborough	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Plymouth	1/8	1/8	1/8	1/8	1/8	1/8	1/7	1/3½
Pontypridd	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Portsmouth	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Preston	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Ramsgate	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Reading	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Redcar	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Redditch	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Reigate	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Retford	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Ripon	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Rochdale	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Rochester	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Rugby	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Saffron Walden	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	11½
St. Albans	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
St. Helens	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Sawbridgeworth	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Saxmundham	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0½
Scarborough	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Sevenoaks	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Sheffield	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Shrewsbury	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Sittingbourne	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Southampton	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Southend-on-Sea	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Southport	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
South Shields	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Stevenage	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Stockport	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Stockton-on-Tees	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Stoke-on-Trent	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Stourbridge	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Stourport	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Stowmarket	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Stratford-on-Avon	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Stroud	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Sunderland	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Swaffham	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	11½
Swansea	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Swindon	1/6	1/6	1/6	1/6	1/6	1/6	1/5	1/1½
Tamworth	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Taunton	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Thetford	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Torquay	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Totnes	1/5	1/5	1/5	1/5	1/5	1/5	1/4½	1/1
Trowbridge	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/3½	1/0½
Tunbridge Wells	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Uttoxeter	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Wakefield	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Walsall	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Wallsend	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Warminster	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Warrington	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Warwick	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Wells (Norfolk)	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	11½
Welwyn Gar. City	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
West Bromwich	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Weston-sup.-Mare	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Weymouth	1/5	1/5	1/5	1/5	1/5	1/5	1/4	1/1
Whitby	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Wigan	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Winchester	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/1
Windsor	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Wisbech	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Wolverhampton	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Woodbridge	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Worcester	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Worksop	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Worthing	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/1
Wrexham	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Wroxham	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	11½
Wymondham	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0½
York	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½

(For rates of wages in the Building Trade in Scotland, see page 513.)

CONTRACTS, COMPETITIONS, &c.

For some contracts still open, but not included in this List, see previous issues. Those with an asterisk are advertised in this number. Certain conditions beyond those given in the following information are imposed in some cases, such as that advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in; the name and address at the end is the person from whom or place where quantities, forms of tender, &c., may be obtained.

BUILDING, PAINTING, ELECTRIC LIGHTING, HEATING, etc.

SEPTEMBER 27.—**Bangour.**—ADDITION.—Addition to Grieve's House at Farm Steading, for the Edinburgh District Board of Control. W. M. Mowat, clerk, Castle-terrace, Edinburgh.

SEPTEMBER 27.—**Barton-upon-Humber.**—HOUSES.—Twelve non-parlour houses, for the U.D.C. C. G. Else, surveyor, High-street.

SEPTEMBER 27.—**Bootle.**—HOUSES.—120 houses in terraces, to be erected on Hawthorne-road, Aughton-road, Province-road, and Monfa-road, for the C.B. Borough Engineer and Surveyor. Deposit £2 2s.

SEPTEMBER 27. — **Colchester.** — ALTERATIONS. — Alterations to the laundry and the master's stores at the Institution, 14, Popes-lane, Colchester, for the T.C. T. H. Baker, architect and surveyor, Head Gate Court.

SEPTEMBER 27.—**Croydon.**—HEATING.—Accelerated low-pressure hot-water heating, &c., at Croydon Telephone Exchange, for H.M. Office of Works. Contracts Branch, H.M. Office of Works, King Charles-street, S.W. 1. Deposit £1 1s.

SEPTEMBER 27.—**Dewsbury.**—PREMISES.—Premises for the Irish National Club. Newbald & Hartley, architects and surveyors, 4, Crown-court, Wakefield.

SEPTEMBER 27.—**Dunfermline.**—IMPROVEMENT.—Demolition of building and clearing of site at the corner of Bridge-street and Chalmers-street, Dunfermline, for the T.C. R. Muir Morton, Burgh Engineer.

SEPTEMBER 27. — **Exmouth.** — HOUSES.—Thirty-six houses on the Cranford site, for the U.D.C. S. Hutton, engineer and surveyor, architect, Engineer and Surveyor's Office, Public Hall.

SEPTEMBER 27.—**Glasgow.**—PLUMBING.—Plumber work of the several buildings &c., in connection with the erection of Mearnskirk Sanatorium, Mearns, Renfrewshire, for the T.C. J. Lindsay, Town Clerk. Deposit £5 5s.

SEPTEMBER 27.—**Harrogate.**—PAINTING.—Painting and redecorating of the interior of the Royal Hall, for the Corporation. C. E. Rivers, Borough Engineer and Surveyor.

SEPTEMBER 27.—**Hereford.**—PAINTING. — Painting and renovating the principal ground floor rooms and corridors at the Shirehall, for the C.C. G. H. Jack, M.I.C.E., County Surveyor.

SEPTEMBER 27.—**London.**—SHOPS AND FLATS.—Erection of a block of shops and flats containing 24 tenements, at Middlesex-street, in the City of London, for the Corporation of London. Office of the City Engineer, Guildhall, E.C.2, between the hours of 10 a.m. and 5 p.m. Deposit £2 2s.

SEPTEMBER 27.—**Manchester.**—EXTENSIONS.—Construction of foundations to works extensions at the Hyde-road tramcar depot, for the T.C. City Architect. Deposit £2 2s.

SEPTEMBER 27. — **Manchester.** — GLAZING. — For patent roof glazing at (1) the Birchfields-road tram depot, and (2) the Parcels depot, Hyde-road, for the T.C. City Architect. Deposit £1 1s. each.

SEPTEMBER 27. — **Mauchline.** — HOUSES. — Sixteen houses at Mauchline, for the Ayrshire C.C. D. R. Sturrock, District Clerk, 84, John Finnie-street, Kilmarnock.

SEPTEMBER 27.—**Ossett.**—ADDITIONS, &c.—To the Ossett Grammar School, for the Governors. E. Lucas, Education Department, Town Hall.

SEPTEMBER 27.—**Shelf.**—BUNGALOW.—Bungalow at Wade House-road. G. R. Oddy, L.R.I.B.A., architect and surveyor, Ward's End-chambers, Halifax.

SEPTEMBER 27. — **South Stoneham.** — HOUSES. — Twenty non-parlour type houses, in blocks of four, and other works in connection therewith, at Wildern-lane, Hodge End, for the R.D.C. W. R. Cowell, surveyor. Deposit £2 2s.

SEPTEMBER 27.—**Sowerby.**—HOUSES.—Two houses on the Albert-road site, Sowerby Bridge, for the U.D.C. J. Eastwood, surveyor.

SEPTEMBER 27.—**West Derby.**—ALTERATIONS.—Proposed alterations to linen rooms to provide four double bedrooms at the Alder Hey Hospital, for the B.G. E. B. Bailey, L.R.I.B.A., 9, Cook-street, Liverpool.

SEPTEMBER 27.—**West Hartlepool.**—REPAIRS.—For (1) erection of electricity sub-stations at Seaton Carew and Brinkburn-road; painting works at County Court (exterior), Museum and Art Gallery (interior), 185 houses on Rift House housing estate and 98 houses on Raby-road housing estate (exteriors), and greenhouse at Grantully, for the C.B. F. Durkin, Borough Engineer.

✱ SEPTEMBER 27.—**Yorkshire.**—REPAIRS AND MATERIALS.—War Department contracts, Term contracts, from October 21, 1926, in the following Engineer District in the Command:—Catterick Camp, Yorkshire. Commanding Royal Engineer, Northumbrian Area, Catterick Camp.

SEPTEMBER 28. — **Croydon.** — EMPLOYMENT EXCHANGE.—Erection of, at Croydon, for the Commissioners of His Majesty's Office of Works. Contracts Branch, King Charles-street, London, S.W.1. Deposit £1 1s. (Cheques payable to the Commissioners.)

SEPTEMBER 28.—**Dewsbury.**—ADDITIONS.—Additions to Boothroyd-lane Council school, for the C.B. H. Dearden, A.R.I.B.A., A.M.I.C.E., Borough Surveyor.

SEPTEMBER 28.—**Ilford.**—SUB-STATION.—New sub-station and transformer enclosure for the Electricity Department, Ley-street, for the U.D.C. H. Shaw, engineer and surveyor. Deposit £2.

SEPTEMBER 28.—**Liverpool.**—FRAME.—Heated frame in the Nursery Grounds, Stanley Park, for the T.C. Land Steward and Surveyor.

SEPTEMBER 28.—**London.**—EXTENSION.—Extension of the existing hot water installation at the Institution, Waterloo House, Waterloo-road, Bethnal-green, E.2, for the Bethnal Green B.C. C. Faulkner Jones, Clerk Administrative Offices, Bishop's-road, E.2. Deposit £1.

SEPTEMBER 28.—**London.** — REDECORATIONS. — External redecorations and general repairs to the hospital buildings, Ducane-road, Shepherds-bush, W.12, for the Hammersmith B.G. A. E. McEwan-Waghorn, F.S.I., and R. F. Miller, P.A.S.I., surveyors, 8, King William-street, Charing-cross, W.C.2. Deposit £2 2s.

SEPTEMBER 28.—**Mexborough.**—WIRING.—Of 44 houses in connection with the Council's housing scheme, for the U.D.C. Electrical Engineer, Electricity Offices, Station-road.

SEPTEMBER 28. — **Middlesex.** — COTTAGES. — Erection of 50 cottages at the Brickfield site, also for the construction of road and sewers for the Southall-Norwood Urban District Council. J. B. Thomson, Assoc.M.Inst.C.E., Town Hall, Southall.

SEPTEMBER 28. — **Middlesex.** — PUBLIC CONVENIENCE.—Erection of, at the Green, Southall, for the U.D.C. J. B. Thomson, Assoc.M.Inst.C.E., Town Hall, Southall.

SEPTEMBER 28.—**Ryde (I. of W.).**—ALTERATIONS.—Alterations, redecorating and repairing the Old Farmhouse at Knighton waterworks, near Newchurch, for the T.C. B. F. Holness, Borough Surveyor and Water Engineer.

SEPTEMBER 28.—**Truro.**—HOUSES.—Goorball, St. Agnes, four; Zelah, St. Allen, four; Three Corners, St. Clement Rural, two; Tregurra-lane, St. Clement Rural, two; Trispen, St. Esme, six; St. Just, St. Just-in-Roseland, four; Coombe Creek, Kea, four; Nansiggans, Kea, two; Three Milestone, Kenwyn Rural, four; Chacewater Hill, Kenwyn Rural, two; Hill Head, Ladock, two; Grampound-road, Ladock, two; Perranwell, Perranzabulee, four; and Probus, Probus, four, for the R.D.C. H. L. Butler, architect, 39, Edward-street. Deposit £1 1s.

SEPTEMBER 28.—**Wallingford.**—BUILDINGS.—Five pairs of E. C. buildings at the rear of the cottages at East Hagbourne, for the R.D.C. P. C. A. Slade, Clerk, 7, St. Martin's-street.

SEPTEMBER 28. — **Wallingford.** — DECORATION — External redecorative work to houses in South-road, Didcot, and at East Hagbourne and Cholsey (total number of houses, 61) for the R.D.C. P. C. A. Slade, Clerk, 7, St. Martin's-street.

SEPTEMBER 28.—**Wath Wood.**—WIRING.—At the Wath, Swinton and District Joint Hospital, for the Board. J. Totty, architect, Moorgate-street, Rotherham.

SEPTEMBER 29.—**Ashborne.**—RECONSTRUCTION.—Supplying and fixing iron and steel work to form cattle pens, auction ring and shedding, and concrete paving work, for the U.D.C. D. Powell, engineer and surveyor. Deposit £2 2s.

SEPTEMBER 29.—**Newcastle-upon-Tyne.**—HOUSES.—Fourteen combined shops and houses at the corner of Stephenson-road and Benton-road, on their High Heaton Estate, for the T.C. Housing Architect, 18, Cloth Market. Deposit £3 3s.

SEPTEMBER 29.—**Teddington.**—BUILDING WORK.—Extension of the Chemical Research Laboratory, National Physical Laboratory, Teddington, for the Commissioners of His Majesty's Office of Works. Contracts Branch, King Charles-street, London, S.W.1. Deposit £1 1s. (Cheques payable to the Commissioners.)

SEPTEMBER 29.—**Warwick.**—HOUSES.—18 non-parlour type and four parlour-type houses in Newburgh-crescent, The Cape, for the T.C. F. P. Trepess & Son, Church-street. Deposit £1 1s.

SEPTEMBER 30.—**Bolton.**—BUILDING.—Transformer sub-station at Bury-road, for the C.B. W. J. H. Wood, Borough Electrical Engineer and Manager, Back-o'-th'-Bank. Deposit £1 1s.

SEPTEMBER 30.—**Clonakilty.**—PIGGERIES.—At Clonakilty Agricultural Station, co. Cork, for the Commissioners of Public Works. J. J. Healy, Secretary, Oifig Oibreach Puibli (Office of Public Works), Baile Atha Cliath (Dublin). Deposit £1.

SEPTEMBER 30. — **Dromod.** — RESTORATION. — Of Dromod ex-R.I.C. barracks, Co. Leitrim, for the Commissioners of Public Works. J. J. Healy, Secretary, Oifig Oibreach Puibli (Office of Public Works), Baile Atha Cliath, Dublin. Deposit £1.

SEPTEMBER 30.—**Falkirk.**—BUILDING.—New Infirmary to be erected at Gartcows, for the Falkirk and District Committee. Duncan Kennedy, W.S., Hon. Secretary, Bank-street.

SEPTEMBER 30.—**Horwich.**—SHOP.—Grocery branch shop at Essex-street, Chorley New-road, for the Co-operative Society, Ltd. Law & Grimshaw, architects, Bank Chambers, Atherton. Deposit, £2 2s.

SEPTEMBER 30. — **Liverpool.** — DEMOLITION AND BUILDING WORK.—Demolition of the existing buildings in Green-lane, West Derby, Liverpool, the clearance of the site, and the erection thereon of new stables and house for the Corporation of Liverpool. City Engineer's Department (Drawing Office), Municipal Buildings, Dale-street, Liverpool. Deposit £2 2s., to the City Treasurer.

SEPTEMBER 30. — **London.** — PLASTER PARTITIONS AND TEAK DOORS.—(1) The construction of Hy-Rib plastered partitions to lift wells; and (2) the supply of teak doors, &c., for the P.O. (London) Tube Railway, for the Commissioners of His Majesty's Office of Works. Contracts Branch, King Charles-street, London, S.W.1. Deposit £1 1s. (Cheques payable to the Commissioners.)

SEPTEMBER 30.—**Maldon.**—REPAIRS.—Carrying out certain work for the preservation of St. Giles' Hospital ruins, Spital-road, Maldon, under the supervision of H.M. Office of Works. Borough Surveyor.

SEPTEMBER 30. — **Omagh.** — HUT. — At Campsie, Omagh, co. Tyrone, for the Committee of the British Legion, Women's Section. Mrs. B. L. L. Edwards, secretary, 3, Woodview-terrace.

SEPTEMBER 30.—**St. Columb Major.**—ALTERATIONS. —Alterations and renovations to the casual wards and sundry other builder's and plumber's work at the Poor-Law Institution, for the B.G. John Ennor, architect, 61, Tower-road, Newquay.

SEPTEMBER 30. — **Scarborough.** — HOUSES. — Erection of 102 in pairs and blocks, for the T.C. Harry W. Smith, A.M.I.C.E., Borough Engineer, Town Hall, Scarborough. Deposit £2 2s.

SEPTEMBER 30.—**Woking.** — COTTAGES. — Seventeen pairs of cottages (13 pairs at Woking Village and four pairs at Horsell), for the U.D.C. G. J. Woolridge, surveyor.

OCTOBER 1.—**Ely.**—HOUSES.—Five pairs of houses on the Prickwillow site, for the U.D.C. W. McKelvie, City Surveyor, Silver-street. Deposit £1 1s.

OCTOBER 1.—**Halifax.**—BUILDING.—Extension to motor bus garage in Skircoat-road tram depot, for the C.B. Borough Engineer, Crossley-street. Deposit £2 2s.

OCTOBER 1.—**London.** — ALTERATIONS AND ADDITIONS.—To the premises, 79, East-hill, Wandsworth, for the Wandsworth Borough Council. E. J. Elford, Borough Engineer, 215, Balham High-road, S.W. 17.

OCTOBER 1. — **London.** — PAINTING. — Internal painting at Cornwall House, Stamford-street, S.E., for the Commissioners of His Majesty's Office of Works. Contracts Branch, King Charles-street, S.W.1 Deposit £1 1s. (Cheques payable to the Commissioners.)

OCTOBER 1.— **Sheffield.**— LABORATORIES.— Erection of research laboratories on a site in Sheffield, for the Secretary of Mines. Establishment Branch, Mines Department, Dean Stanley-street, London, S.W.1. Deposit £1 1s. (cheques payable to Accounting Officer, Mines Department).

✱ OCTOBER 1.—**Surbiton.**—DWELLING HOUSE.—Construction of a dwelling house, for the Superintendent at the Alexandra Recreation Ground, Surbiton, for the U.D.C. C. Edgar Shelly, Clerk, District Council Offices, Ewell-road, Surbiton.

OCTOBER 2.—**Clayton-le-Moors.**—HOUSES.—Twelve houses for the U.D.C. A. Dodgson, Clerk. Deposit £3 3s.

OCTOBER 2.—**Swinton and Pendlebury.**—FENCING.—Providing and fixing about 470 lineal yds. of iron hurdle fencing, together with gates, at the Open-air school, Swinton, for the E.C. H. Entwisle, surveyor, Swinton, Manchester.

OCTOBER 4.—**Dromiskin.**—SCHOOL.—New National school at Dromiskin, co. Louth, for the Rev. Canon Johnson, P.P. Ashlin & Coleman, architects, 7, Dawson-street, Dublin. Deposit £2 2s.

OCTOBER 4.—**East Preston.**—COTTAGES.—Eight cottages at Goring, for the R.D.C. R. E. Booker, Surveyor, Red Roof, Mill-lane, Rustington, Littlehampton.

OCTOBER 4.—**Keighley.**—CLINIC.—At the Victoria Hospital, for the West Riding C.C. West Riding Architect, County Hall, Wakefield.

OCTOBER 4.— **London.**— DWELLINGS.— Erection of a block of dwellings on the Birchfield-street area, Poplar, for the L.C.C. Architect to the Council (Room No. 3), County Hall, Westminster-bridge, S.E. Deposit £2 (to the cashier of the Council).

OCTOBER 4.—**Lostwithiel.**—HOUSES.—Ten houses in St. George's Park, for the T.C. J. Knight, Pendene, Lostwithiel. Deposit £1.

OCTOBER 4.—**Saddleworth.**—ALTERATIONS.—Alteration of an existing building to house a Cornish boiler and the building of brickwork seatings and chimney flue, and building of new brickwork chimney, at the Runninghill Institution, for the B.G. J. H. Bradbury, clerk, Union Offices, Uppermill, near Oldham.

OCTOBER 5.—**Essex.**—MEMORIAL HALL.—Erection of King Edward VII Memorial Hall, Black Notley Sanatorium, for the Public Health and Housing Committee, Essex County Council. Jno. Stuart, County Architect, Springfield Old-court, Chelmsford. Deposit £1 1s. to F. H. Owers, County Accountant, Duke-street, Chelmsford.

OCTOBER 5.—**Glasgow.**—ADAPTATION.—Adaptation work at Charing Cross Branch Post Office, for H.M. Office of Works. Architect, H.M. Office of Works, 122, George-street, Edinburgh.

OCTOBER 5.—**Ireland.**—BUILDINGS.—For (1) reconstruction of a building at Stepaside, co. Dublin, for the accommodation of the Garda Siochana; (2) erection of a Garda Siochana Station at Kilmessan, co. Meath; (3) erection of a Garda Siochana Station at Moneygall, Offaly; (4) erection of a Garda Siochana Station at Templeoram, co. Kilkenny; (5) erection of a Garda Siochana Station at Corbetstown, co. Kilkenny; (6) reconstruction of a portion of Cashel ex-R.I.C. Barracks, co. Tipperary, for the accommodation of the Garda Siochana; (7) erection of a Garda Siochana Station at Galbally, co. Limerick; (8) erection of a Garda Siochana Station at Goleen, co. Cork; (9) erection of a Garda Siochana Station at Moycullen, co. Galway, for the Commissioners of Public Works. J. J. Healy, Secretary, Oifig Oibreach Puibli (Office of Public Works), Baile Atha Cliath (Dublin). Deposit £1 each.

OCTOBER 5.—**Kingston-upon-Hull.**—IMPROVEMENT. —For alterations to boiler house, new mess room and lavatories, for the T.C. H. Bell, City Electrical Engineer and Manager, Electricity Works, Sculcoates. Deposit, £1 1s. each.

OCTOBER 5.—**Sibsey.**—COTTAGES.—Six pairs of cottages, for the R.D.C. T. H. Tyson, Surveyor, 4, Red Lion-street, Boston. Deposit £2 2s.

OCTOBER 6.—**Cardiff.**—PAINTING.—Painting ten houses, Taff-terrace, Radyr, for the R.D.C. W. Farrow, surveyor, 20, Park-place.

OCTOBER 6. — **Clacton-on-Sea.** — CONVENIENCES.— Erection of public conveniences at East Cliff, for the U.D.C. Council's Surveyor, Council Offices, Clacton-on-Sea. Deposit £2 2s.

OCTOBER 6.—**East Grinstead.**—EXTENSION.—Extension of East Grinstead Post Office, for the Commissioners of His Majesty's Office of Works. Contracts Branch, H.M.O.W., King Charles-street, London, S.W.1. Deposit £1 1s. (Cheques payable to the Commissioners).

OCTOBER 7.—**Belfast.**—PLASTERING.—Plaster work at the new Museum and Art Gallery, Botanic Gardens Park, for the C.B. R. B. Roe & Sons, Quantity Surveyors, Kingscourt, 17, Wellington-place. Deposit £2 2s.

OCTOBER 7.—**Oval.**—TELEPHONE EXCHANGE.—Erection of the "Oval" Telephone Exchange, for the Commissioners of His Majesty's Office of Works. Contracts Branch, King Charles-street, London, S.W.1. Deposit £1 1s. (Cheques payable to the Commissioners.)

OCTOBER 8.—**Newton Abbot.**—HOUSES.—Seventy houses on their Broadlands housing site, for U.D.C. C. D. White, Surveyor, Town Hall.

OCTOBER 9.—**Worcester.**—OFFICE.—Weights and measures office and electricity sub-station, for the Corporation. City Surveyor.

OCTOBER 11.—**Erith, Kent.**—ROOF WORK.—Reconstruction of the roof of the beam engine house at the Southern Outfall Works, Crossness (in the Urban District of Erith, in the County of Kent), in reinforced concrete supported by steel lattice girders, including the removal of the existing roof and the construction of a parapet wall, for the L.C.C. Chief Engineer of the Council, Old County Hall, Spring Gardens, S.W.1. Deposit £5, by cheque or draft to the order of the L.C.C.

OCTOBER 12.—**Middlestown.**—SCHOOL.—New school for 410 children at Shitlington, Middlestown, for the West Riding E.C. Education Department, County Hall, Wakefield.

OCTOBER 12.—**Owston Skellow.**—HEATING.—Installation of low-pressure heating apparatus at Askern Sutton-road new school and Owston Skellow new school, for the West Riding E.C. The Education Department, County Hall, Wakefield.

✱OCTOBER 13.—**Bury.**—EMPLOYMENT EXCHANGE.—Erection of at Bury, for the Commissioners of His Majesty's Office of Works. Contracts Branch, King Charles-street, London, S.W.1. Deposit £1 1s. (cheques payable to the Commissioners).

OCTOBER 13.—**Cookstown.**—COTTAGES.—Nineteen single labourers' cottages, 34 double labourers' cottages, and for fencing all the plots, for the R.D.C. A. M. Brennen, engineer.

✱OCTOBER 14.—**Darlaston, Wednesbury.**—EMPLOYMENT EXCHANGE.—Erection of at Darlaston, Wednesbury, for the Commissioners of His Majesty's Office of Works. Contracts Branch, King Charles-street, London, S.W.1. Deposit £1 1s. (cheques payable to the Commissioners).

OCTOBER 14.—**Southwick.**—FLATS.—Twenty self-contained flats in St. Aubyns-road, Fishersgate, for the U.D.C. G. W. Warr, surveyor. Deposit £1 1s.

✱OCTOBER 18.—**Chertsey.**—COTTAGES, DRAINAGE AND FENCING.—Erection of 24 cottages (12 pairs), formation of drainage, fences, &c., on the housing estate at Green-lane, Addlestone, for the U.D.C. Ernest J. Castle, Clerk to the Council, Council Offices, Chertsey. Deposit £1 1s.

✱OCTOBER 18.—**Chester.**—SCHOOL.—Erection and completion of new Council elementary school, at Heathfield-road, Ellesmere Port, for 640 scholars, for the County of Chester Education Committee. A. Anstead Browne, F.R.I.B.A., County Architect, Newgate-street, Chester. Deposit £2 2s.

OCTOBER 18.—**Dublin.**—BUILDINGS.—Four water-tube boilers, with stokers, economisers, feed pumps and accessories, to form a complete steam-raising installation, and the necessary buildings, with foundations to house the plant, are also included, for the C.B. City Electrical Engineer, Electricity Offices, Fleet-street. Deposit £5 5s.

OCTOBER 18.—**Steyning East.**—HOUSES.—Twenty houses at Carden-avenue, Patcham, for the R.D.C. G. W. Warr, Surveyor, Town Hall, Southwick. Deposit £1 1s.

NO DATE.—**Aberdeen.**—HOUSES.—Eight houses at Hayton-road, Woodside. Tawse & Allan, architects, 10, Bon Accord-square.

NO DATE.—**Birmingham.**—ALTERATIONS.—Structural alterations to premises situate at 117 and 118, Great Lister-street, Birmingham, for the T.C. H. H. Humphries, City Engineer and Surveyor. Deposit £3 3s.

NO DATE.—**Drighlington.**—W.C.'s.—Five w.c.'s at the Council school, Girls' Department. W.R. Education Office, 8, St. John's North, Wakefield.

NO DATE.—**Wakefield.**—REBUILDING.—Of the Welcome Inn, Dewsbury-road, for John Smith's Tadcaster Brewery Co., Ltd. Garside & Pennington, architects and surveyors, Ropergate, Pontefract.

NO DATE.—**Wetherby.**—HALL.—Masonic Hall at Wetherby. A. Suttel, architect.

NO DATE.—**Witham.**—EXTENSIONS.—Construction of 313 yards of 9 in. stoneware pipe sewer and 313 yards of 3 in. cast-iron water main and works incidental thereto, in back Rivenhall-road, and also extension to the Council Offices, for the U.D.C. D. Jenkinson, surveyor.

MATERIALS, etc.

SEPTEMBER 27.—**Bromley.**—MATERIALS.—Broken granite, Kent ragstone, and Chert or Sevenoaks stone, flints and footpath gravel, tarred ragstone, for the R.D.C. Leonard O. Wall, Clerk.

SEPTEMBER 27.—**Oldbury.**—MATERIALS.—Stoneware pipes, cement, castings, coal, bricks, disinfectants, slag and tarmacadam, ragstone, for the U.D.C. W. Greenwood, Engineer and Surveyor.

SEPTEMBER 27.—**Pontefract.**—MAINS.—Cast-iron mains and specials, for the T.C. B. Hudson, Gas Manager, Gasworks.

SEPTEMBER 28.—**Dublin.**—MATERIALS.—Flags, kerb and lime, for the T.C. J. J. Murphy, Town Clerk.

SEPTEMBER 29.—**Thurnscoe.**—MATERIALS.—Cement, ¼ in. to 1½ in. graded gravel or concreting stone, clean sharp pit sand, ¼ in. granite chippings, 10 in. by 6 in. granite-faced concrete kerbs, 6 in. and 12 in. stoneware pipes, 4 in. pipes and stoneware gullies, 12 in. diameter, 24 in. deep, for the U.D.C. A. Plunkett, surveyor.

SEPTEMBER 30.—**Gellygaer.**—MATERIALS.—Paving, kerb and channel; concrete, fence posts, drain pipes, cement and lime, cast-iron goods, smithwork, ironmongery, oils, and grease, galvanised fencing wire, barbed and plain, for the U.D.C. F. Read, surveyor, Council Offices, Hengoed.

OCTOBER 1.—**Portsmouth.**—MATERIALS.—Ballast, sand, and grit; Portland cement; timber; castings, &c., for the T.C. B. Hall, General Manager and Engineer, Guildhall, Portsmouth.

OCTOBER 9.—**Edinburgh.**—MATERIALS.—Iron, iron castings, glass, paints, oils, wood, timber, tools, repairs on foot pavements and granolithic paving, gravel, sand and whinstone, granite and tar macadam materials, also artificial flagstones, pitch, pitch oil, and bituminous preparations, cement, brick, and fireclay goods, for the T.C. Burgh Engineer.

OCTOBER 11.—**Litherland.**—STONE.—2,000 tons of stone pitching, for the U.D.C. Geo. Ponsford, Engineer and Surveyor, Council Offices, Sefton-road.

OCTOBER 18.—**Hereford.**—MATERIALS.—Broken granite, slag, limestone, gravel, sand, cement, lime, bitumen, tar, water fittings, manhole covers, gully grates, &c., for the T.C. A. Baker, Town Clerk.

ENGINEERING, IRON AND STEEL.

SEPTEMBER 30.—**Middleton.**—BRIDGE.—Demolition of the existing road bridge and the erection of a new reinforced concrete bridge at Middleton, for the Laurencekirk D.C. of the Kincardineshire C.C. D. J. Bell, County Road Surveyor, County Buildings, Stonehaven. Deposit £1.

OCTOBER 1.—**Newport (I. of W.).**—WALL.—For (1) a reinforced concrete quay wall on the east side of the River Medina, and (2) for removal of mud, &c., in front of such wall and depositing same at Seaclose, for the T.C. E. A. Slater, Borough Surveyor.

OCTOBER 2.—**Manchester.**—STEELWORK.—Steelwork for the proposed bridge to carry Hart-road (late Demesne-road) over the Platt Brook, Wilbraham-road estate, for the T.C. P. M. Heath, Town Clerk. Deposit £2 2s.

OCTOBER 4.—**Redbrook.**—WIDENING.—Widening and strengthening of the bridge on the Christchurch-Salisbury main road, for the Hampshire C.C. W. J. Taylor, County Surveyor, The Castle, Winchester. Deposit £1 1s.

NOVEMBER 1.—**Egypt.**—STEELWORK.—For (*a*) the supply and erection of steel and ironwork for lock regulator, swing bridge and subsidiary works; (*b*) the construction of masonry of a lock, regulator and subsidiary works, at Kafr Bulin, for the Ministry of Public Works. Chief Inspecting Engineer, Egyptian Government, 41, Tothill-street, Westminster, S.W.1. Deposit £2 14s. 6d.

DECEMBER 1.—**Denmark.**—BRIDGE.—Construction of the superstructure, substructure, as well as approach spans, with shore piers, for a double-track railway bridge across Lillebelt, for the Danish State Railways. Danish Legation, London. Deposit, Danish Kroner 500.

ROAD, SEWERAGE, AND WATER WORKS.

SEPTEMBER 27.—**Finchley.**—MAKING-UP.—Of Upper Cavendish-avenue (second portion), Orchard-avenue (second portion), Lyndhurst-gardens (second portion), Hervey-close (second portion), Finchley-way, Brentway, Hamilton-way, for the U.D.C. P. T. Harrison, engineer, 9, The Hawthorns, Regent's Park-road, Finchley, N. 3. Deposit £3.

SEPTEMBER 27.—**Ilford.**—WIDENING.—Widening and improving Hainault-street, for the U.D.C. H. Shaw, engineer and surveyor. Deposit £2 2s.

SEPTEMBER 27.—**Pontefract.**—PAVING.—Paving an area of about 2,100 sq. yds. with granite setts on a concrete foundation and reconstruction of footpaths, on the Penfold-hill, for the T.C. W. H. Newton, Borough Engineer. Deposit £2 2s.

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SEPTEMBER 27.—**Pontefract.**—FOOTPATHS.—Surfacing the roads and footpaths on the Love-lane estate with tar macadam. Approximate area: Roads 2,640 sq. yds., footpaths 1,430 sq. yds., for the T.C. W. H. Newton, A.M.I.C.E., Borough Engineer. Deposit £2 2s.

SEPTEMBER 27.—**Sowerby.**—STREET WORKS.—On the Willow-street housing site, for the U.D.C. J. Eastwood, Surveyor.

SEPTEMBER 27.—**Wirral.**—SEWERS.—Construction of sewers, &c., as follows (1) sewers, pumping chambers, and pumps, in the parish of Moreton, and (2) sewering in the parishes of Moreton, Saughall Massie, Upton, Greasby, Frankby, Arrowe, and Irby, for the R.D.C. W. Webb Shennan, engineer and surveyor, 15, Hamilton-square, Birkenhead. Deposit £3 3s. each.

SEPTEMBER 28.—**Ilkeston.**—MAKING-UP.—Forming, kerbing, channelling, paving, metalling, draining, making-up, and completing Manor-road, for the T.C. Geo. Smith, Borough Surveyor. Deposit £1 1s.

SEPTEMBER 28.—**Liverpool.**—FENCING.—Supplying and fixing about 2,000 yds. lin. wrought-iron fencing in the various parks and recreation grounds, for the T.C. Land Steward and Surveyor.

SEPTEMBER 28.—**London.**—MAKING-UP.—For (*a*) making-up and paving with tar macadam a portion of Laycock-street, and (*b*) supply and delivery of castings and other ironwork, for the Islington B.C. Borough Engineer.

SEPTEMBER 28.—**Newbiggin-by-the-Sea.**—WIDENING.—Of Spital Burn Bridge, &c., for the U.D.C. Surveyor, Newbiggin-by-the-Sea. Deposit £1.

SEPTEMBER 28.—**Newton Abbot.**—SEWERS.—Construction of about 2,110 lineal yds. of 9 in., 8 in., 7 in., and 6 in. diameter stoneware pipe sewers, together with manholes, detritus, settling and storm tanks, percolating filters, humus tanks, and other incidental works, for the R.D.C. F. W. S. Stanton, consulting engineer. Deposit £3 3s.

SEPTEMBER 28.—**Okehampton.**—SEWER.—Laying a new sewer in Dennis Park, Chagford, and for extending water main at Hatherleigh to the new houses, for the R.D.C. F. Hawkin, Clerk.

SEPTEMBER 28.—**Southall-Norwood.**—IMPROVEMENT.—Making up of Gladstone-road, for the U.D.C. J. B. Thomson, engineer and surveyor.

SEPTEMBER 29.—**Havant.**—MAKING-UP.—Of Down End-road and Down-end (part), Drayton, Farlington, for the R.D.C. Surveyor, West-street.

SEPTEMBER 30.—**Barnsley.**—MAIN.—Proposed 4 in. cast-iron water main and fittings in Wakefield-road, Hill-top, Carlton, for the R.D.C. J. R. Wilkinson, engineer and surveyor, 13, Regent-street.

SEPTEMBER 30.—**Calcutta.**—WATER SUPPLY.—Supply and laying in prepared trenches, steel and cast-iron pipes, &c., for the conduit from the new reservoir at Taliah to the new pumping station, for the Corporation. Chief Engineer.

OCTOBER 2.—**Belper.**—MAIN.—Laying about 1,100 yds. of 5 in. water main from Bessyloan Reservoir to Heage boundary at Belper, for the U.D.C. G. & F. W. Hodson, Consulting Engineers, Bank Chambers, Loughborough. Deposit £5 5s.

OCTOBER 2.—**Farnworth.**—SEWERING.—Sewering, levelling, paving, metalling, flagging, channelling and otherwise making good Joseph street, St. James'-street, Young-street, Glass-street, Percy-street, back Glass-street, and back Young-street, for the U.D.C. F. Ashton, surveyor. Deposit £2 2s.

OCTOBER 2.—**Horsforth.**—SURFACING.—For (1) concrete foundation and footpath works; (2) asphalt surfacing of the Kirkstall, Otley and Shipley main road, for the West Riding C.C. West Riding Surveyor, County Hall, Wakefield. Deposit £1.

OCTOBER 2.—**Kirkburn.**—ROAD.—Construction of a new road at Kirkburn, 1,300 yards in length, or thereabouts, for the East Riding C.C. County Land Agent, County Hall, Beverley.

OCTOBER 2.—**London.**—PAVING.—Of Freshwater-road (part), Hill House-road, Faygate-road (part), Minehead-road, Streatham Vale, Ivyday-grove, and Downton-avenue (part), Streatham; Brathway-road (part), Longstaff-road (part), Sutherland-grove (part), and Cromer Villas-road, Southfield; Ellerton-road (part), and Lyford-road (part), Springfield, for the Wandsworth B.C. E. J. Elford, Borough Engineer, 215, Balham High-road, S.W. 17. Deposit £1 1s.

OCTOBER 2.—**Oswestry.**—SEWERAGE.—Construction of stoneware and cast-iron sewers, varying in size from 6 in. to 12 in. diameter, manholes, pumping station, and other appurtenant works, at Whittington, near Oswestry, for the R.D.C. Berrington & Son, engineers, Prudential Chambers, Lichfield-street, Wolverhampton. Deposit £5 5s.

OCTOBER 2.—**Plymouth.**—SEWERS.—Laying of sewers and the formation of a roadway, &c., in connection with the Becon Down Building Estate. D. Ward & Son, surveyors, 11, The Crescent.

OCTOBER 2.—**Whitefield.**—MAKING-UP.—Of Egerton-road, for the U.D.C. J. Knight, surveyor.

OCTOBER 4.—**Barnsley.**—MAKING-UP.—Of Longman-road (part of), Caxton-street (part of), New-street, Ardsley, Oxford-street, Ardsley, for the C.B. Borough Engineer, Fairfield House.

OCTOBER 4.—**Rothwell.**—MAINS.—For (1) Supply of a large quantity of lined, &c., cast-iron or spun pipes and specials for water mains from 3 in. to 12 in. in diameter, and (2) laying of water mains, for the U.D.C. J. Southwart, surveyor. Deposit £1 1s.

OCTOBER 4.—**Sunbury-on-Thames.**—EXTENSION.—Sewering and making-up Cavendish-road, Sunbury, for the U.D.C. H. F. Coales, engineer and surveyor.

OCTOBER 5.—**Morley.**—SURFACING.—With tarred macadam a portion of the pathways adjoining the secondary school, for the Governors. J. H. Willis, Clerk.

OCTOBER 5.—**South Dublin.**—SEWERAGE.—Construction of 424 yards lineal 18 in. and 160 yards lineal 12 in. concrete pipe sewers in Crumlin-road, for the R.D.C. Surveyor. Deposit £1 1s.

OCTOBER 5.—**South Dublin.**—EXTENSION.—Providing and laying of 3 in., 4 in., and 6 in. water mains of an aggregate length of about 1,280 yds. in the Butterfield-avenue, for the R.D.C. G. Gallagher, clerk, 1, James's-street. Deposit £1 1s.

OCTOBER 6.—**Camelford.**—IMPROVEMENT.—(1) for about 2,500 cub. yds. excavation and tipping to

bank, together with road formation, temporary footbridge, &c.; (2) for about 29 yards run of 6 ft. by 6 ft. ferro-concrete culvert with masonry ends; (3) for about 550 yards of wrought iron or concrete post and wire fencing, in connection with the Longabridge-road improvement scheme, for the R.D.C. Capt. C. J. Jenkin, engineer, 91, Old Town-street, Plymouth. Deposit £1.

OCTOBER 6.—**Wharfedale.**—SEWERAGE.—700 lineal yards of salt-glazed ware pipe sewers, 9 in. diameter, together with manholes and other works, in the parish of Alwoodley, for the R.D.C. E. J. Silcock, engineer, 10, Park-row, Leeds.

OCTOBER 8.—**London.**—PAVING.—Supply and laying of approximately 12,550 super yards of 4 in. creosoted wood block paving on sections of their main roads, for the Southwark B.C. P. H. Gray, Town Clerk, Southwark Town Hall, Walworth-road, S.E.17.

OCTOBER 8.—**Newton Abbot.**—SEWERS.—Construction of roads and sewers in connection with the second instalment of their Broadlands housing scheme, for the U.D.C. C. D. White, surveyor, Courtenay-street. Deposit £2 2s.

OCTOBER 8.—**Tadcaster.**—SEWERAGE.—Providing and laying about 610 yards of 6 in. earthenware pipes, together with manholes, ventilators, &c., for the R.D.C. H. M. Driver, Surveyor to the Council, Garforth, near Leeds.

OCTOBER 11.—**Lytham St. Annes.**—SEWERAGE.—Construction of two storage tanks and pumping station in mass and reinforced concrete, together with other appurtenant works. for the T.C. G. Midgley Taylor, of John Taylor & Sons, Chartered Civil Engineers, Caxton House, Westminster. Deposit £5.

OCTOBER 11.—**Sutton.**—MAKING-UP.—Of Bramley-road and Upper Vernon-road, for the Sutton and Carshalton U.D.C.'s. H. Bolton, Clerk, Sutton Council: C. P. Lovelock, Clerk, Carshalton, Council. Deposit £1 1s.

OCTOBER 12.—**Highworth.**—SEWERAGE.—Construction of stoneware and cast-iron sewers, varying in size from 6 in. to 12 in. diameter, manholes, tanks, sludge drying beds, and other appurtenant works, at Chisledon, near Swindon, for the R.D.C. Berrington & Son, engineers, Prudential Chambers, Lichfield-street, Wolverhampton. Deposit £3 3s.

OCTOBER 12.—**Worksop.**—SEWERAGE.—Construction of about 2,700 lineal yds. of salt-glazed ware and concrete pipe sewers, varying in size from 9 in. to 18 in. diameter, together with manholes and other works, in the parishes of Hodsock and Carlton-in-Lindrick, for the R.D.C. E. J. Silcock, engineer, 25, Victoria-street, Westminster, S.W. 1. Deposit £5.

OCTOBER 19.—**Chester.**—EXTENSION.—Laying water mains for the laying complete of a water main from Hornsmill Corner, Hapsford, to Ince, for the R.D.C. B. M. Trew, surveyor, St. Martin's House. Deposit £2 2s.

Auction Sales, Tenders, etc.

✱SEPTEMBER 30.—**London.**—Goddard & Smith will sell, at the Auction Mart, 70, Seymour-place, W. 1, an extensive stock of ex W.D. goods of various kinds. 70, Seymour-place, W. 1.

SEPTEMBER 31.—**London.**—William Whiteley, Ltd., will sell, at 168, Queen's-road, Bayswater, W.2, shop fittings and fixtures in mahogany, angona and walnut wood. Auctioneers, 158 and 160, Queen's-road, W.2.

OCTOBER 1.—**Sutton.**—J. T. Skelding & Co. will sell, without reserve, by order of the Banstead Downs Estate, Ltd., on the premises, Brighton-road, Sutton, plant and materials; also stock of timber. Auctioneers, 48, Gresham-street, Guildhall, E.C. 2.

OCTOBER 5, 6 AND 7.—**Bushey Heath.**—Perry & Phillips will sell on the premises, Caldicote Towers, Bushey Heath, interior and exterior fixtures and fittings, previous to demolition of the mansion, octagon summer house, lean-to conservatory, model school buildings. Auctioneers, 59, High-street, Bridgnorth.

✱OCTOBER 6 AND FOLLOWING DAYS.—**Swansea.**—John M. Leeder & Son will sell, by direction of the liquidator of Messrs. Topham, Jones & Railton, Ltd. (in voluntary liquidation), at Plant Depot, Crymlyn Burrows, a large quantity of contractors' and engineers' plant, locomotives, &c. Auctioneers, 46, Waterloo-street, Swansea.

Competitions.

(See Competition News page 478.)

Public Appointments.

✱OCTOBER 1.—**Belfast.**—CHIEF ASSISTANT.—Required by the Belfast Education Committee in the Education Architect's Department. R. S. Wilshere, Education Architect, Education Office, College-square, Belfast.

✱OCTOBER 4.—**Birkenhead.**—ARCHITECTURAL ASSISTANT.—Required in the Borough Engineer and Surveyor's Office by the Corporation. Charles Brownridge, M.Inst.C.E., Borough Engineer and Surveyor, Town Hall, Birkenhead, endorsed "Architectural Assistant."

OCTOBER 4.—**Cape Town.**—SENIOR LECTURER AN ORGANISER.—Required in the Building Trades Department of the Cape Technical College. Chalmers & Guthrie, Ltd., South Sea House, 37, Threadneedle-street, London, E.C. 2.

OCTOBER 4.—**Cape Town.**—LECTURER.—Required in the Building Trades Department of the Cape Technical College. Chalmers & Guthrie, Ltd., South Sea House, 37, Threadneedle-street, London, E.C. 2.

✱NO DATE.—**Kenya.**—MASON BUILDERS.—Required by the Government of Kenya, for the Technical Training Branch of the Education Department, for a tour of thirty months' service, with prospect of extension. Apply, at once, by letter, Crown Agents for the Colonies, 4, Millbank, Westminster, London, S.W. 1, quoting M/14720.

✱NO DATE.—**Rosyth.**—TEMPORARY DRAUGHTSMAN.—Required with thorough knowledge of building construction, &c. Superintending Civil Engineer, H.M. Dockyard, Rosyth.

PROPOSED NEW BUILDINGS & OTHER WORKS*

IN these lists care is taken to ensure the accuracy of the information given, but it may occasionally happen that, owing to building owners taking the responsibility of commencing work before plans are finally approved by the local authorities, "proposed" works at the time of publication have been actually commenced. Abbreviations: T.C. for Town Council; U.D.C. for Urban District Council; R.D.C. for Rural District Council; E.C. for Education Committee; B.G. for Board of Guardians; B.C. for Borough Council: P.C. for Parish Council; M.H. for Ministry of Health; M.T. for Ministry of Transport; C.B. for County Borough; B.E. for Board of Education; M.A.B. for Metropolitan Asylums Board; and M.W.B. for Metropolitan Water Board.

AYLESBURY.—The T.C. passed plans: Shelter, Hazell's sports ground, Hazell, Watson & Viney; house, Manor Park, E. Jenkins; two houses, Alexander-road, F. Cannon; two houses, Fleet-street, W. Evett.—The T.C. is to make application to the M.H. for sanction to borrow £26,888 for the erection of 62 houses at California.

BALLYCASTLE.—The R.D.C. has received the Ministry of Home Affairs order authorising the erection of 52 cottages.

BARNES.—The U.D.C. passed plans:—Two houses, Lowther-road, for Ives Bros.; semi-detached houses, Bicester-road, by Mr. Rowell, for Goodhew and Harrison; house, Berwyn-road, for Couch & Coupland; house, 29, Park-drive, for Fox & Champion; six houses, Sheen-lane, for Couch & Coupland; two houses, Stonehill-road, for Rosevears; All Saints' Church, East Sheen-avenue, for J. B. L. Tolhurst; two detached houses, York-avenue, for Newborn & Smith; house, Sheen-lane, junction with Vicarage-road, for Newborn & Smith; social hall, adjoining 77, Castelnau, by Mr. Binns, for Trustees of the Roman Catholic Diocese.

BERKHAMSTED.—The U.D.C. passed plans:—Bungalow in Ashlyns-road, for Mrs. R. Catherall; four cottages in Shrublands-road, for C. Harrowell; two cottages in Queen's-road, for C. Harrowell; Scouts Hut in New-road, Northchurch.

BIRMINGHAM.—The Public Entertainments Committee of the Birmingham Justices has given authority for the erection of a picture house at Bordesley Green East. The building is to accommodate 1,566 people, and will cost about £25,000.

BOSTON.—The Sanitary Committee has passed plans: house, J. H. Flowers, on the North Fortyfoot Bank; bungalow, W. Ewen, Sleaford-road.

BOURNEMOUTH.—It has been decided to proceed at once with the erection of a new Wesleyan Church in Alma-road, at an estimated cost of £6,000.

BRIDGWATER.—The T.C. has adopted a scheme, which has been sanctioned by the M.H., for the erection of a further 54 houses of the parlour type and 44 non-parlour. The Ministry has also sanctioned the Council borrowing the sum of £48,000 to carry out the scheme. The tender of three local builders for the erection of the houses amounted to £45,807, and these were accepted.

BRISTOL.—The Estates Committee have provisionally agreed to grant 97, Victoria-street, Temple, to H.M. Office of Works for the erection of buildings. The Office of Works are acquiring the property between 97, Victoria-street, and Mitchell-lane, and propose to utilise the whole site for building a new employment exchange.—With regard to the Eugene-street area improvement scheme, the Housing Committee of the T.C. stated that a supplementary contract has been arranged to carry out for the sum of £689 additional work of erecting boundary walls, gates, railings, levelling ground, turfing, and constructing paths, &c. The Committee has arranged for the erection of additional houses at Bedminster Down (14), Speedwell (eight), and Rodney-road (56). The cost will be £35,380. Direct labour will be used in the case of 64 houses. The Committee also recommend that application be made to the M.H. for sanction to borrow the sum of £635,105, the bulk of which is associated with the Sea Mills estate.

BROMLEY (KENT).—The T.C. has passed plans: F.P. Duthoit & Son's amended plan of warehouse, Talbot-road; L. H. Harrington, house, Park-avenue; A. E. Thomas, house, Bromley-common; G. L. Walton's two houses, Farnaby-road; M. Marshall's five lock-up garages, Meadow-road; Ecott, Widgery & Ecott's house, Sunningdale-road; Dibben & Co.'s house, Farnaby-road; Levens & Sons' house, Spencer-road; T. E. Burford's two houses, Park-avenue; P. Coad's house, Page Heath-lane; A. Gibson's house, Hollgrave-road; W. A. Atkinson's 12 houses, road No. 5, Bromley Park Garden estate; Edwin Evans & Sons' six houses, road No. 5, Bromley Park Gardens estate; L. Daynes Wood's four houses, Burnt Ash-lane; H. E. Kemp & Co.'s house, Siward-road.

DORCHESTER.—The T.C. passed plans: House, in Herringstone-road, for Lt.-Col. L. C. Hope; new chancel at Fordington St. George's Church, for the St. George's Church Building Committee; bungalow in Monmouth-road, for W. R. Marks; bungalow in Coburg-road, for S. N. Oborn; club house in High West-street, for the Dorset Federation of Women's Institutes; eight houses at the junction of Chalk-road and Damers-road, for the C.C.

DROITWICH.—The M.H. has sanctioned the application of the R.D.C. for the raising of loans for the erection of six houses each at Crowle and Ombersley.

DUDLEY.—The T.C. has decided to purchase property at Dixon's Green, known as The Mount, now used as a hostel for women students at the Training College, for £1,500.

ELHAM.—Plans passed by the R.D.C.: Bungalow, Berrick-lane, Lympne, H. Britcher; two cottages at Morstock-lane, Sellindge, W. Stickells; bungalow, Uphill, Hawkinge, Rev. A. R. Simpson; two bungalows, Cowgate, Hawkinge, F. E. T. West; bungalow, Canterbury-road, Elham, J. W. Gambrill; bungalow, Canterbury-road, Swingfield, Mr. A. Hart; bungalow, Lyminge, W. E. Pearson; house at Eastbrook, Lyminge, Mrs. Mansfield.

FALMOUTH.—The M.H. has accepted the T.C.'s proposals for the erection of 99 houses at Penwerris.

FARSLEY.—A scheme of extensions are to be carried out at Stephenson's, Ltd., warehouse and garage of the Sunshine Bakeries in New-street.

HALIFAX.—Extensions to the children's ward and the joinery department at the Infirmary are to be carried out at an estimated cost of £863.

HEDGE END.—The South Stoneham R.D.C. have acquired a site at Wildern-lane for the provision of 20 non-parlour type cottages.

HELSTON.—The R.D.C. have under consideration a housing scheme which is estimated to cost between £30,000 and £40,000.

HUCKNALL.—The M.H. has sanctioned the borrowing by the U.D.C. of £12,000 for the erection of 24 houses.

HURST.—The Council has approved plans for two bungalows in Wenlock-street, bungalow in Higher Kingstreet, and two houses off Warwick-road.

HYDE.—Scottish Artificial Silks, Ltd., is about to be incorporated to carry on the business of artificial silk spinners and manufacturers at Kirkcudbright, and also to acquire the Providence Mill, Hyde, for spinning.

HYTHE.—The T.C. has passed plans: House, Fairlight-road, for Dr. Carnegie; house, 15, Tower-gardens, for P. Hoskins; house in Bartholomew-street, for A. H. Davis.

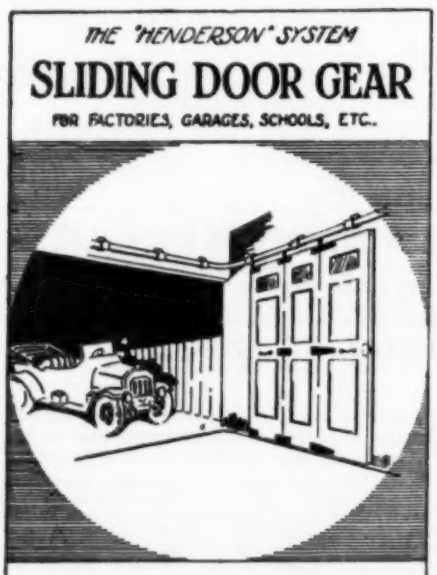
LEEDS.—Changes are in contemplation in connection with the running of the Majestic in City-square. It is the intention of the management to convert the restaurant into a large dancing hall.

LETCHWORTH.—The U.D.C. has passed plans: Mrs. Lamprell, house, Green-lane; Mrs. E. H. Housden, bungalow, Nevells-road; G. F. Rowlingson, house, Willian-way; Animals' Defence League, second section of new abattoir, bacon factory and training centre (block B), Green-lane; Hertfordshire Territorial Association, offices, drill hall and rifle range, Icknield-way.

LONDON (HAMMERSMITH).—The B.C. passed plans: Chapel, at rear of West London Hospital, for A. H. Scott; building, Hythe-road Triplex Glass Works, for J. W. Bateson.—The Housing Committee recommend the B.C. that the panel architects be instructed to prepare, for submission to the Council, ¼ in. detail drawings, elevation and specification of the 111 tenements to be erected in connection with the Hammersmith (Southern) Improvement scheme.

LONDON (WESTMINSTER).—There is a scheme under consideration at the present time for the demolition of the Royal Mews in Buckingham Palace-road and the building on the site of a new wing for Buckingham Palace, to provide better accommodation for the domestic staff there.

* See also our List of Contracts, Competitions, etc.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LONDON (ST. PANCRAS).—The B.C. has received the Electricity Commissioners' sanction to the borrowing of £3,250 in connection with the cost of the reconstruction of the engine room at the King's-road Power Station.

LOUGHBOROUGH.—The E.C. recommend the purchase of the Limehurst estate. The site is to be used for the erection of a school.

LOWESTOFT.—The T.C. recommend that, subject to the consent of the Board of Trade, the plan prepared by the Borough Surveyor for the extension of the spur groyne to the South Pier by another 100 ft. be approved, and the work be put in hand; and that application be made to the M.H. for sanction to a loan for carrying out the work. The scheme is estimated to cost £2,000.—The sanction of the M.H. has been received to the borrowing of £20,560 for the erection of 51 houses on the Blackheath-road site.—Application is to be made to the Electricity Commissioners for sanction to a loan of £53,000 for the extension of generating plant, &c., at the Electricity Works.—The Council has approved the plan of the Borough Surveyor for the construction of a lavatory on the Triangle at an estimated cost of £350.—The Borough Surveyor has been authorised to renovate the Council Chamber during the vacation.—Plans approved: R. J. Edwards, for bungalow, Carlton-road; F. Geater, for two bungalows, Beccles-road; W. Weaving, for house, Acton-road; Dyer & Balls, cottage, Hall-road, and cottage, Yarmouth-road; A. E. Ingles, cottage, Heath-road; H. H. Self, for house, Corton-road; Mrs. H. Grimble, house, Bird's-lane; J. Knight, two houses, Seago-street; Boulton & Paul, two cottages private road off Beccles-road, Carlton Colville.

LUTON.—The Electricity Commissioners have sanctioned the borrowing of £1,727 for the building work in connection with the erection of Dunstable substation.—The T.C. has resolved that tenders be submitted for painting the iron and woodwork of the Depot building.

MALDON.—The R.D.C. passed plans: Clubroom, at Riverside estate, for Mr. Lawlerstate; bungalow, Plains-road, Great Totham, E. T. Harding; bungalow, Tolleshunt D'Arcy, E. Blaxall; house, Crescent-road, Heybridge, A. H. Howlett; lock-up shop, Church-road, Tiptree, Messrs. Brown & Hearsum; bungalow, Wickham Bishops, Mr. Greenhill; warehouse, The Stores, Heybridge Basin.

MANSFIELD.—The T.C. passed plans: R. Allen, house, Jenny Beckett's-lane; C. C. Stafford, house, Grange-avenue; Mrs. J. M. Perkins, bungalow, Sheepbridge-lane; F. Stringfellow, milk factory, Sutton-road; Harold Ashley, six bungalows, Perlethorpe-avenue; H. James, two houses, Bottle-lane; L. T. Cadogan, house and garage, Sutton-road; H. James, bungalow, Southwell-road; J. Martin, house, off Grange-avenue; Electricity Department, high tension sub-station, Reindeer-street.—The T.C. has decided to ask for sanction from the M.H. to build a further 100 houses.

MELTON MOWBRAY.—The R.D.C. passed plans: Bungalow, Thorpe Satchville, for T. Topley; house, slaughter-house, and buildings at Gaddesby, for W. Dixon, Leicester.

MINEHEAD.—The U.D.C. has granted to the owners of the Parks Estate permission for the development of the estate. The Town Planning Committee has also approved the lay-out of parts of the Dunster Castle estate on the North Hill and in the Parks.

MYTHOLMROYD.—The D.C. has decided to draw the attention of the C.C. to the need for improving the County Bridge in the centre of the village.

NAIRN.—New harbour construction works in accordance with plans and specification now being prepared are to be carried out at an estimated cost of £47,000.

NEWARK.—The T.C. has made an application to the M.H. for which an inquiry has been held for sanction to borrow £12,000 for the provision of mains and services, meters, and cookers, and £10,000 for the provision of working capital in connection with their gas undertaking.

NEWQUAY.—The U.D.C. have under consideration a housing scheme for 30 detached or semi-detached houses.

NORTHWOOD.—The Holy Trinity Church is being enlarged, at a cost of £7,500, to double its seating accommodation to 620.

ORRELL.—The U.D.C. passed plans: Two houses, Orrell-road, for Miss Hartley and Mrs. Hampson; two bungalows, Orrell-road, for J. Smallshaw; and two houses in Moor-road, for Grimshaw & Hattersley.

OTLEY.—The U.D.C. are to erect an additional 78 houses and are acquiring 33 acres at Newhall-with-Clifton, and 9 acres in Farnley, all of which it is intended to develop for housing purposes.

PEMBROKE.—The U.D.C., after considering tenders received for the repairs to 38 cottages, has resolved that a new specification should be prepared by the Surveyor and submitted to the Housing Committee, and that tenders should be advertised for again.

PORTSLADE.—The U.D.C. has received the M.H. sanction to the borrowing of £20,000 for the erection of houses on Sheildale-road housing site.

PUDSEY.—The Borough Surveyor has prepared plans for new public baths at an estimated cost of £30,000.

ROCHDALE.—The Housing Committee has decided to invite tenders for alternatively 120 and 240 brick houses with asbestos sheet lining for a similar number of iron houses.

ROCHESTER.—The following plans have been passed by the T.C.: House, Willis-avenue, for J. H. Brooker; bungalow, Hill-road, Borstal, for W. Parsons; block of four shops, corner of High-street, and Star Hill, for E. Basset Willis; two semi-detached houses, Ethelbert-road, for The Vines Congregational Church; house, Windmill-street, for Mr. Hazelden.

ROMFORD.—The B.G. has approved the report from W. Evans, architect, upon the additional accommodation required for the assistant medical officers, the approximate cost of which would be £200. Plans and specifications are to be prepared, and tenders be obtained subject to the sanction of the M.H.

SALFORD.—The sub-committee appointed to consider the question of accommodation at the Royal Technical College has presented its report to the E.C., which has directed that a further report should be prepared as to a scheme for extending the college.

SALTASH.—The M.H. has sanctioned the Council's application to the raising of a loan of £6,400 for ten houses.

SHEFFIELD.—Messrs. Steinlet & Maxwell, architects, Saville-row, Newcastle-on-Tyne, have a scheme in preparation for a local syndicate for the erection of a new cinema and billiard hall combined. In connection with the proposed new working men's club for Woodseats a suitable site has been obtained in "The Dale," and a building committee has been formed, Mr. L. Dronfield, 45, Olevet-road, Woodseats, being the honorary secretary, *pro tem.*—Sheffield's new fire station, the plans of which are well advanced, will provide accommodation for ten engines. Tenders are being asked for the demolition of the property on the site on which the station is to stand and which adjoins the present headquarters of the brigade.

SHEPTON MALLET.—The U.D.C. has decided to build 30 more houses.

SHOREHAM.—The U.D.C. has obtained the formal sanctions from the M.H. for £10,000 for housing purposes.

SOLIHULL.—The District Council has decided to purchase sites for the erection of 18 houses at Tanworth-in-Arden, Olton, and Knowle, and also provisionally accepted a tender of £5,670 for the erection of 12 new houses at Lapworth and Hockley Heath.

SOUTHAMPTON.—Major G. S. Szlumper, assistant general manager of the Southern Railway Company, has placed the first contract in connection with Southampton's £13,000,000 dock extension scheme, which is to be carried out on the Western Shore. When completed the scheme will provide 16,600 ft. of additional quays, which will be sufficient to accommodate twenty of the world's largest liners. Preliminary work, which is to be carried out by the James Dredging, Towage, and Transport Co., of Southampton, provides for the reclamation of eighteen acres of mud land adjacent to the Royal Pier. The work is to be carried out under the supervision of F. E. Wentworth Sheilds, the docks engineer of the S.R. Co.

STANLEY.—The U.D.C. has obtained permission from the M.H. to build an additional 72 houses, and have instructed their surveyor to prepare the necessary specifications in order to expedite the scheme.

STOCKTON.—The R.D.C. has passed plans for two motor garages in the back street between Pinewood and Beechwood-roads, Preston, for Mr. Wray; additions to chauffeur's cottage, Woodside Hall, Preston, Sir John Harrison; and a temporary bungalow on the site of the old brickworks, Wolviston-road, Billingham.

SWANSEA.—Following the B.E. report on the inadequacy of accommodation at St. David's School, plans have been drawn up for the erection of six additional classrooms. In order to carry out this improvement, it has been necessary to purchase a warehouse adjoining the school. The architects are Grant & Goodchild, 9, Quay-street, Cardiff.

TADCASTER.—Messrs. Thomson & Dixon are the architects for offices and flats to be erected for the Yorkshire Bacon Factory, Ltd.

TAVISTOCK.—The U.D.C. has decided to place a tablet on the wall of the Crowndale Farm, Tavistock, to mark the birthplace of Sir Francis Drake.

THORNTON.—The M.H. has sanctioned the borrowing of £393 for land for fire brigade purposes and £200 for town-planning purposes.—The Surveyor has been requested to prepare a draft scheme for the construction of a promenade and erection of groynes.

THURSTASTON.—The mansion of Dawpool, Thurstaston, on the estate which the late Mr. Thomas Ismay acquired for £260,000, is to be dismantled and dwelling-houses built.

WALLASEY.—The well-known Guinea Gap Baths at Seacombe are to be extended and improved by the Health Committee of the Council at a cost of about £6,000.

WALTON-LE-DALE.—Plans have been approved for 76 houses in Brownedge-road, Lostock Hall.

WATFORD.—The R.D.C. passed plans: House in Newlands-avenue, Radlett, for C. Fitzgerald, and two houses in Beech-avenue, Radlett, for W. J. Wiggs & Co.

WEMBLEY.—Residents of Wembley have raised or promised £11,000 for the erection of a local hospital.

WESHAM.—The Council are applying for sanction to borrow £2,250 for the purpose of erecting a fire station and offices.

WHISTON.—The R.D.C. has approved plans prepared by H. Davies, architect, Wellington-buildings, Liverpool, for the erection of a new hotel at Rainhill, for J. Jones & Co., Ltd.

WILLINGTON (CO. DURHAM).—The U.D.C. has received sanction from the M.H. to borrow £12,265 for the erection of another 30 houses by direct labour. Messrs. Hays & Gray have been appointed architects.

WINCOBANK.—Funds are being raised by the congregation of the Parish Church for the purpose of renovating the interior of the edifice, installation of electric light, &c., estimated to cost £250.

WINDSOR.—The T.C. has approved the erection of 138 more houses on the Vale Farm estate at Clewer, subject to the sanction of the M.H.

WORCESTER.—The City Council has approved sketch plans and estimates for the remodelling of the High-street end of the Market House, where it is proposed to erect two shops and an arcade of 13 shops, at an estimated cost of £5,850.

WORTLEY.—A scheme for the provision of a public mortuary is under consideration by the R.D.C.

FIRES.

ABERDEEN.—Cluny Castle was the scene of an alarming and destructive fire. The damage is roughly estimated at from £60,000 to £70,000.

LEEDS.—A fire has occurred and destroyed the greater part of the building and machinery of the Norseland Sardine Canning Co., Ltd.

NEW COMPANIES

The particulars quoted below have been compiled by Messrs. Jordan & Sons, Ltd., Company Registration Agents, of 116 & 117, Chancery-lane, W.C.2, from the documents available at the Companies' Registry.

PLATT & FEATHERSTONE, LTD. (215,038), Registered July 14. Boothferry-road, Goole. York. Builders and contractors. Nominal capital, £9,000.

DEACON & CO. (LAVENHAM), LTD. (215,077). Registered July 16. Builders, contractors, &c. Nominal capital, £500.

W. H. RICKETTS & SON, LTD. (215,099). Registered July 16. 115, Bedford-road, Clapham, S.W.4. Builders and decorators, &c. Nominal capital, £1,200.

AGRAPHITE, LTD. (215,070). Registered July 15. 80, Coleman-street, E.C.2. Dealers in paint, graphite, preservatives, &c. Nominal capital, £2,000.

ISAAC COLLETT & SONS, LTD. (215,031). Registered July 14. Builders' merchants, &c. Nominal capital, £11,000.

FLETCHER TAYLOR & CO., LTD. (215,066). Registered July 15. Station Works, Murton, near York. Steel structural and general engineers, &c. Nominal capital, £3,000.

WATSON & WORSNOP, LTD. (215,064). Registered July 15. Slaters and tilers, &c. Nominal capital, £4,000.

H. A. COOPER, LTD. (214,983). Registered July 12. 6–8, Lime Street-square, E.C.3. General builders, contractors, &c. Nominal capital, £1,000.

JOHN GOODRIDGE & SONS, LTD. (215,032). Registered July 14. Windsor Building-yard, The Ropewalk, Neath. Builder and contractor. Nominal capital, £2,000.

MINERA SILICA QUARRIES, LTD. (215,036). Registered July 14. Quarry proprietors. Nominal capital, £8,000.

CHANDOS ESTATES, LTD. (215,249). Registered July 24. 13, Albemarle-street, W.1. Builders and contractors, &c. Nominal capital, £100.

BRIGHTON DOWNS SUPPLY CO., LTD. (215,149) Registered July 20. Wick House, Warren-road, Brighton. Builders' merchants, &c. Nominal capital, £2,000.

GOLDERS GREEN LAND CO., LTD. (215,173). Registered July 21. Regent House, Kingsway, W.C.2. To acquire land and buildings at Golders Green or Cricklewood, Middlesex, and to lay out land for building purposes, &c. Nominal capital, £7,000.

"HANDEN," LTD. (215,177). Registered July 21. General builders nad contractors, &c. Nominal capital, £100.

UNITED ALKALI ESTATES, LTD. (215,287). Registered July 26. To construct, furnish, maintain and manage buildings and erections, &c. Nominal capital, £10,000.

PHILSON & CO., LTD. (215,325). Registered July 28. Builders', ironmongers' and plumbers' merchants. Nominal capital, £3,000.

SURREY BORDERS ESTATES, LTD. (215,332). Registered July 28. 3, Addiscombe-road, Croydon. Builders, &c., and to enter into an agreement with the Falkland Park Estate Co., Ltd., by H. P. McCabe for the purchase of certain lands at South Norwood. Nominal capital, £8,800.

GREENWAY & LUDLOW, LTD. (215,353). Registered July 29. Orchard House, 14, Great Smith-street, Westminster, S.W.1. Stone, marble and granite merchants, &c. Nominal capital, £10,000.

R. GREGORY, LTD. (215,398). Registered July 30. 16 and 16A, Fuller-street, Bethnal Green, E. Builder and contractor. Nominal capital, £9,000.

FREDERICK GEORGE & CO., LTD. (215,431). Registered July 31. 93 and 94, Chancery-lane, W.C.2. Land and building surveyors, &c. Nominal capital £500.

BRITISH SOLOMITE CO., LTD. (215,426). Registered July 31. 178, City-road, E.C.1 Builders' merchants, &c. Nominal capital, £120

RUSSELL BROS., LTD. (215,400). Registered July 30. Waidshouse-road, Nelson. Joiners and cabinet makers. Nominal capital, £4,000.

PRICES CURRENT OF MATERIALS

[Owing to the exceptional circumstances which prevail at the present time, prices of materials should be confirmed by inquiry.—Ed.]

BRICKS, &c.

Per 1,000 Alongside, in River Thames up to London Bridge.

	£ s. d.
Best Stocks	4 5 6
Second Hard Stocks	3 19 6

Per 1,000. Delivered at London Goods Stations.

	£ s. d.		£ s. d.
Flettons, at King's Cross	2 13 3	Best Blue Pressed Staffs	9 5 0
Do. grooved for Plaster	2 15 3	Do. Bullnose	9 15 0
Do. Bullnose	3 8 3	Blue Wire Cuts	7 5 0
Best Stourbridge Fire Brick:—			
2½ in.	8 11 0	3 in.	10 3 0
GLAZED BRICKS—			
Best White Ivory, and Salt Glazed Stretchers	21 10 0	D'ble Str'tch'rs	30 0 0
		D'ble Headers	27 0 0
		One Side and two ends	31 0 0
Headers	21 0 0	Two Sides and one End	32 0 0
Quoins, Bullnose and 4½ in. Flats	28 0 0	Splays and Squints	29 10 0

Second Quality, £1 per 1,000 less than best. Cream and buff, £2 extra over white. Other colours, Hard Glaze, £5 10s. extra over white.

BREEZE CONCRETE SLABS.

Delivered London.

	s. d.		s. d.
2 in. per yd. super	1 11	3 in. per yd. super	2 9
2½ in. " "	2 4	4 in. " "	3 6

	s. d.	
Thames Ballast	10 6 per yd.	delivered 2 miles radius Paddington.
Pit Sand	13 9 " "	
Thames Sand	14 6 " "	
Best Washed Sand	14 6 " "	
⅜ in. Shingle for Ferro-Concrete	12 9 " "	
¾ in. " "	14 0 " "	
¾ in. Broken Brick	11 6 " "	
Pan Breeze	7 6 " "	

Per ton delivered in London area in full van loads.

Best Portland Cement. British Standard Specification. Test £2 18 0 to £3 3 6 51s. alongside at Vauxhall in 80-ton lots.

	£ s. d.
Ferrocrete per ton extra on above	0 10 0
Super Cement (Waterproof)	4 8 0
Roman Cement	8 15 0
Parian Cement	5 15 0
Keene's Cement, White	5 15 0
" " Pink	5 10 0
Plaster, Coarse, Pink	3 0 0
" " White	3 12 6
" Fine	5 12 0
Sirapite, Coarse	3 9 0
" Finish	3 17 0
Grey Stone Lime	2 16 9
Chalk Lime	2 16 9
Best Ground Blue Lias Lime	2 9 6
Hair per cwt.	2 2 6
Granite Chippings	1 12 0

NOTE.—Sacks are charged 1s. 9d. each and credited 1s. 6d. if returned in good condition within three months carr. pd.

Stourbridge Fireclay in s'cks 35s. 0d. per ton at rly. dp.

STONE.

	s. d.
BATH STONE—delivered in railway trucks at Westbourne Park, Paddington, G.W.R., or South Lambeth, G.W.R., per ft. cube	2 9½
Do. do. delivered in railway trucks at Nine Elms, L. & S.W.R., per ft. cube	2 11½
PORTLAND STONE—	
Brown Whitbed, in random blocks of 20 ft. average, delivered in railway trucks at Nine Elms, L. & S.W.R., South Lambeth Station, G.W.R., and Westbourne Park, Paddington, G.W.R., per ft. cube	4 4
Do. do delivered on road wagons at above stations, per ft. cube	4 5
White basebed, 3d. per ft. cube extra.	
NOTE.—1d. per ft. cube extra for every foot over 20 ft. *average*, and ½d. beyond 30 ft.	
HOPTON-WOOD STONE—	s. d.
Delivered at any Goods Station, London.	
Random blocks from 10 ft. and over P. ft. cb.	17 0
Sawn two sides "	27 0
Sawn three or four sides "	32 0
YORK STONE, BLUE—*Robin Hood Quality.*	
Delivered at any Goods Station, London.	
6 in. sawn two sides landings to sizes (under 30 ft. super.) Per ft. super	5 6
6 in. rubbed two sides, ditto "	6 0
3 in. sawn two sides slabs (random sizes) "	2 3½
2 in. to 2½ in. sawn one side slabs (random sizes) "	1 6½
1½ in. to 2 in. ditto, ditto "	1 4
HARD YORK—	
Delivered at any Goods Station, London.	
Scappled random blocks Per ft. cube	6 3
6 in. sawn two sides landing to sizes (under 40 ft. super) Per ft. super	5 1½
6 in. rubbed two sides, ditto "	6 1½
4 in. sawn two sides slabs (random sizes) "	2 10
3 in. ditto ditto "	2 1½
2 in. self-faced random flags Per yd. super	9 0

CAST STONE.

Delivered in London Area in full van loads, per ft. cube:—Plain, 8s. 6d.; Moulded, 9s. 6d. Cills, 10s. 0d.

WOOD.

GOOD BUILDING DEAL.

Inches.	per stan.	Inches.	per stan.
4 × 11	£28 0	3 × 6	£21 0
4 × 9	25 0	3 × 11	25 0
4 × 8	24 0	2 × 11	25 0
4 × 7	23 0	3 × 9	24 0
4 × 8	21 0	2½ × 9	23 0
3 × 8	20 0	3 × 4½	22 0
3 × 7	20 0	3 × 4	22 0
2½ × 7	20 0		

PLANED BOARDS.

1 × 11	£27 0	1 × 9	£26 0

PLAIN EDGE FLOORING.

Inches.	per sq.	Inches.	per sq.
⅝	20/-	1¼	31/-
¾	22/-	1½	34/-
1	25/-		

TONGUED AND GROOVED FLOORING.

Inches.	per sq.	Inches.	per sq.
1	25/-	⅝	16/6
1¼	31/-	¾	19/-
1½	34/-	1	24/-

MATCHING (BEST).

BATTENS.

Inches.	s. d.
⅜ × 2	2 6 per 100 ft.

SAWN LATHS.

Per bundle	0 2 4

1" AND UP THICK.

	£ s. d.	£ s. d.
Dry Austrian Wainscoat, per ft. cube	0 16 0 to	0 18 0
Dry American and /or Japanese Figured Oak, ft. cube	0 15 0 to	—
Dry American and/or Japanese Plain Oak, ft. cube	0 11 0 to	0 13 0
Dry sq. edged Honduras Mahogany, ft. cube	0 16 0 to	0 18 0
Dry Log cut Honduras Mahogany, ft. cube	0 18 0 to	1 1 0
Dry Cuba Mahogany, ft. cube	1 4 0 to	1 10 0
Dry Teak, ft. cube	0 13 0 to	0 15 0
Dry American Whitewood, ft. cube	0 11 0 to	0 14 0
Best Scotch glue, per cwt.	4 10 0 to	—
Liquid Glue, per cwt.	4 7 0 to	5 10 0

SLATES.

First quality slates from Bangor or Portmadoc carriage paid in full truck loads to London Rate Station. Per 1,000 of 1,200.

	£ s. d.		£ s. d.
24 by 12	37 12 6	18 by 10	21 2 6
22 by 12	34 0 0	18 by 9	18 12 6
22 by 11	31 5 0	16 by 10	17 12 6
20 by 12	29 15 0	16 by 8	13 15 0
20 by 10	25 12 6		

TILES.

Delivered at London rate stations in full truckloads of not less than 4 tons.

	Per 1,000 f.o.r. London. £ s. d.
Best machine-made tiles from Broseley or Staffordshire district	5 12 6
Ditto hand-made ditto	5 17 6
Ornamental ditto	6 2 6
Hip and valley tiles (per dozen) Hand-made	0 9 6
Machine-made	0 9 0

METALS.

JOISTS, GIRDERS, &c., TO LONDON STATION, PER TON—	£ s. d.
R.S. Joists, cut and fitted	12 10 0
Plain Compound Girders	14 10 0
" Stanchions	16 10 0
In Roof Work	19 10 0

MILD STEEL ROUNDS.

To London Station, per ton.

Diameter.	£ s. d.	Diameter.	£ s. d.
¼ in.	12 0 0	⅝ in. to ⅞ in.	10 15 0
⅜ in.	11 0 0	1 in. to 2½ in.	10 10 0

WROUGHT-IRON TUBES AND FITTINGS—(Discount off List for lot of not less than £7 net value delivered direct from Works, 2½ per cent. less above gross discounts, carriage forward if sent from London Stocks.)

	Tubes.	Fittings.	Flanges.
Black Gas	60 %	50 %	60 %
Galvanised Gas	45 %	40 %	50 %
Blue Water	55 %	45 %	55 %
Galvanised Water	33½ %	35 %	45 %
Red Steam	50 %	40 %	50 %
Galvanised Steam	32½ %	30 %	40 %

C.I. HALF-ROUND GUTTERS—London Prices, ex Works.

Per yd. in 6 ft. lengths.	Gutters.	Angles and Nozzles.	Stop Ends.
3 in.	1/3½	1/11½d.	3½d.
3½ in.	1/4½	1/1½	3½d.
4 in.	1/6	1/3	3½d.
4½ in.	1/7½	1/4½	4½d.
5 in.	1/10½	1/6½	5½d.
O.G. GUTTERS.			
3 in.	1/8	1/4½	3½d.
3½ in.	1/8	1/4½	3½d.
4 in.	1/9½	1/4½	3½d.
4½ in.	1/11½	1/7½	4½d.
5 in.	2/4½	1/10½	5½d.

RAIN-WATER PIPES, &c.

Per yd. in 6 fts.	Pipe.	Bends, stock angles.	Branches, stock angles.
2 in. plain	1/10½	1/3	1/9½
2½ in. "	2/0½	1/4½	2/1½
3 in. "	2/6	1/9	2/7½
3½ in. "	2/11½	2/0½	3/0½
4 in. "	3/5	2/6½	3/8½

L.C.C. COATED SOIL PIPES—London Prices, ex Works.

	Pipe.	Bends, stock angles.	Branches, stock angles.
	s. d.	s. d.	s. d.
2 in. per yd. in 6 fts. plain	3 3	2 4½	2 10
2½ in. "	3 9	2 7½	3 7
3 in. "	4 6	2 10	4 2½
3½ in. "	4 11½	3 7	4 11½
4 in. "	5 5½	4 0½	5 9

L.C.C. COATED DRAIN PIPES—London Prices ex Works.

	Pipe.	Bends, stock angles.	Branches, stock angles.
	s. d.	s. d.	s. d.
3 in. per yd. in 9 ft. lengths	4 4	5 1	8 0½
4 in. " "	6 2	5 8	10 0
5 in. " "	7 2	10 10	17 1
6 in. " "	8 6	13 2	21 9

Gasken for jointing, 38/6 per cwt.

	Per ton in London. £ s. d.		£ s. d.
IRON—			
Common Bars	13 0 0	to	14 10 0
Staffordshire Crown Bars—good merchant quality	14 5 0	—	15 5 0
Staffordshire Marked Bars	16 5 0	—	17 5 0
Mild Steel Bars	10 0 0	—	11 0 0
Steel Bars, Ferro-Concrete quality, basis price	10 0 0	—	11 0 0
Hoop Iron, basis price	12 0 0	—	13 0 0
" Galvanised	27 0 0	..	28 0 0
Soft Steel Sheets, Black—			
Ordinary sizes to 20 g.	13 5 0	..	14 5 0
" " " 24 g.	14 5 0	..	15 5 0
" " " 26 g.	16 5 0	..	17 5 0
Sheets Flat Best Soft Steel, O.R. & C.A. quality—			
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	15 10 0	..	16 10 0
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 22 g. and 24 g.	16 10 0	..	17 10 0
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 26 g.	18 10 0	..	20 10 0
No. 1 quality £4 per ton extra.			
Flat and Galvanised Corrugated Sheets—			
Ordinary sizes, 6 ft. to 9 ft. to 20 g.	18 10 0	..	19 10 0
Ordinary sizes, 6 ft. to 9 ft. to 22 g. and 24 g.	19 0 0	..	20 0 0
Ordinary sizes, 6 ft. to 9 ft. to 26 g.	22 0 0	..	23 0 0
Sheets Galvanised Flat. Best quality—			
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. to 20 g. and thicker	22 0 0	..	23 0 0
Best Soft Steel Sheets, 22 g. and 24 g.	24 0 0	..	26 0 0
Best Soft Steel Sheets, 26 g.	25 10 0	..	26 10 0
Cut Nails, 3 in. to 6 in.	19 0 0	..	20 0 0
(Under 3 in. usual trade extras.)			

METAL WINDOWS.—Standard sizes, suitable for complete houses, including all fittings, painting two coats, and delivery to job, average price about 1s. 4d. to 1s. 7d. per foot super.

LEAD, &c.

(Delivered in London.)	£ s. d.
LEAD—Sheet, English, 4 lb. and up	45 0 0
Pipe in coils	46 10 0
Soil Pipe	48 10 0
Compo Pipe	49 10 0

NOTE—Country delivery, 30s. per ton extra: lots under 3 cwt., 3s. per cwt. extra, and over 3 cwt. and under 5 cwt., 1s. 6d. per cwt. extra. Cut to sizes, 2s. cwt. extra.

	£ s. d.	
Old lead, ex London area, at Mills per ton	30 10 0	—
Do., ex country, carriage forward per ton	31 10 0	—

COPPER.

		s. d.
Seamless Copper tubes (basis)	per lb.	1 1
Strong sheet	"	1 0
Thin	"	1 1
Copper nails	"	2 3
Copper wire	"	2 4

PLUMBERS' BRASS WORK.

Delivered in London.

NEW RIVER PATTERN SCREW DOWN BIB COCKS FOR IRON.

½ in.	¾ in.	1 in.	1¼ in.	1½ in.	2 in.
29/-	45/-	76/-	153/-	246/-	510/- per doz.

NEW RIVER PATTERN SCREW DOWN STOP COCKS AND UNIONS.

½ in.	¾ in.	1 in.	1¼ in.	1½ in.	2 in.
41/6	62/-	92/-	174/-	300/-	588/- per doz.

NEW RIVER PATTERN SCREW DOWN MAIN FERRULES.

½ in.	¾ in.	1 in.
39/6	60/-	116/6 per doz.

CAPS AND SCREWS.

1¼ in.	1½ in.	2 in.	3 in.	3½ in.	4 in.
7/6	10/-	14/-	23/-	30/-	42/- per doz.

DOUBLE NUT BOILER SCREWS.

½ in.	¾ in.	1 in.	1¼ in.	1½ in.	2 in.
7/6	11/-	17/-	29/-	36/-	63/- per doz.

BRASS SLEEVES.

1¼ in.	2 in.	3 in.	3½ in.	4 in.
10/-	12/-	20/-	24/-	31/- per doz.

NEW RIVER PATTERN CROYDON BALL VALVES, S.F.

½ in.	¾ in.	1 in.	1½ in.	1½ in.
35/-	56/-	98/-	162/-	228/- per doz.

DRAWN LEAD P. & S. TRAPS WITH BRASS CLEANING SCREW.

1½ in.	1½ in.	2 in.	3 in.
8 lbs. P. traps	33/-	41/-	56/-	101/- per doz.
8 lbs. S. traps	35/-	45/-	66/-	126/- "

TIN—English Ingots, 2/10 per lb. SOLDER—Plumbers' 1/3, Tinmen's 1/6, Blowpipe 1/7 per lb.

PAINTS, &c.

		£ s. d.
Raw Linseed Oil,	in pipes per gallon	0 2 11
" " "	in barrels "	0 3 0
" " "	in drums "	0 3 3
Boiled "	in barrels "	0 3 3
" "	in drums "	0 3 6
Turpentine	in barrels "	0 5 5
"	in drums (10 gall.) "	0 5 7
Genuine Ground English White Lead, (In not less than 5 cwt. casks.)	per ton	54 15 0
GENUINE WHITE LEAD PAINT— "Father Thames," "Nine Elms," "Park," "Supremus," "St. Paul's," "Morganswyte," "Polacco," "J." Brand and other best brands (in 14 lb. tins) not less than 5 cwt. lots	per ton delivered	73 5 0
Red Lead, Dry (packages extra)	per ton	45 10 0
Best Linseed Oil Putty	per cwt.	0 15 0
Filocol	"	0 15 6
Size, XD Quality	"	0 3 6

Continued on next page

"The information given on this page has been specially compiled for THE BUILDER and is copyright. Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the highest or lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

PRICES CURRENT OF MATERIALS (*contd.*)

GLASS.

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

	Per Ft.		Per Ft.
15 oz. fourths ..	3½d.	32 oz. fourths	7½d.
15 „ thirds	4½d.	32 „ thirds	9½d.
21 „ fourths ..	4½d.	Obscured Sheet, 15 oz.	3½d.
21 „ thirds	5½d.	„ „ 21 „	5½d.
26 „ fourths ..	6d.	Fluted 15oz. 6½d., 21oz.	9½d.
26 „ thirds	7½d.	En'lled 15oz. 5½d., 21oz.	7½d.

Extra price according to size and substance for squares cut from stock.

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

	Per Ft.
⅛ Rolled plate	4½ d.
3/16 Rough rolled	5½d.
¼ Rough rolled	6 d.
Figured Rolled, Baltic, Oceanic, Arctic, Stipolyte, and small and large Flemish White	8½d.
Ditto, tinted	9d.
Rolled Sheet	6d.
White Rolled Cathedral	5½d.
Tinted do.	7½d.

Cast Plate is same price as rough rolled.

VARNISHES, &c.

		Per Gallon £ s. d.
Oak Varnish	Outside	0 14 0
Fine ditto	ditto	0 16 0
Fine Copal	ditto	0 18 0
Pale Copal	ditto	1 0 0
Pale Copal Carriage	ditto	1 4 0
Best ditto	ditto	1 12 0
Floor Varnish	Inside	0 18 0
Fine Pale Paper	ditto	0 18 0
Fine Copal Cabinet	ditto	1 2 6
Fine Copal Flatting	ditto	1 0 6
Hard Drying Oak	ditto	0 18 0
Fine Hard Drying Oak	ditto	0 19 0
Fine Copal Varnish	ditto	1 0 0
Pale ditto	ditto	1 2 0
Best ditto	ditto	1 12 0
Best Japan Gold Size		0 12 6
Best Black Japan		0 10 6
Oak and Mahogany Stain (water)		0 12 0
Brunswick Black		0 7 6
Berlin Black		0 14 6
Knotting (patent)		1 5 0
French and Brush Polish		0 17 0
Liquid Dryers in Terebine		0 9 0
Ogilvie Black Enamel		0 7 0

New Canadian Cathedral.

The foundation stone of the new Cathedral of Victoria has been laid by the Bishop of London.

New Cinema at Sheffield.

The Provincial Cinematograph Theatres, Ltd., of which Lord Ashfield is Chairman, is proposing to erect, at a cost of £130,000, a new cinema and dance hall in central Sheffield.

Obituary.

The death, at the age of 64, of Mr. John Thomas Buckton, builder and auctioneer, has occurred at Headingley.

Sale of Plant and Materials, &c.

Messrs. J. T. Skelding & Co., auctioneers, of 48, Gresham-street, Guildhall, E.C. 2, will sell, on October 1 (*not* September 29, as previously announced), without reserve, by order of the Banstead Downs Estate, Ltd., on the premises, Brighton-road, Sutton, plant and materials, also stock of timber.

Timber Houses.

Two Aldridge-Gierloff timber houses, the first to be constructed in the United Kingdom, have been formally opened on the Walker Housing Estate, Newcastle. The houses represent the application of British standards of housing comfort to Norwegian methods of building construction. Each contains six rooms and a bathroom, with balconies, bow windows, and steep seat, for an exclusive cost of £485. The risk of fire is eliminated by the use of fireproof lining.

Bricks for Anatolia.

The Commercial Secretary at Constantinople (Colonel H. Woods, O.B.E.) reports that the Anatolian Railway Administration is calling for tenders for the supply of refractory bricks as follows:—2,000 rounded bricks, 5,000 flat bricks. Tenders will be received up to 2.15 p.m. on Monday, October 18, 1926, and should be addressed to the Administration des Chemins de fer Anatolie, Bagdad. A copy of the specification and conditions of tenders (in French), together with blue print showing dimensions of the bricks required, is available for inspection by interested firms at the offices of this Department (Room 41), 35, Old Queen-street, S.W.1.

THE SCOTTISH BUILDER

NEW BUILDINGS IN SCOTLAND

Arbroath.—HOUSE.—The Dean of Guild Court has passed plans for the erection by the Town Improvement Association of another large villa in Viewfield-road.

Brechin.—CINEMA.—A site has been secured in High-street for the erection of a cinema, for the Brechin Cinema, Ltd. The architect is Mr. S. B. Low, of Roselea Cottage E., Newport, Fife.

Glasgow.—REPAIRS.—Owing to the dilapidated condition of Toward Pier, the Clyde Lighthouses Trustees have given instructions to their engineers to prepare plans for improvements at the lighthouse jetty.—The new dance hall in Sauchiehall-street, being built for Waldorf, Ltd., is making good progress; from plans by Mr. Neil C. Duff, 187, West George-street, it is estimated that the construction will cost about £30,000.

Irvine.—HOUSES.—The Town Council are to consider the erection of an additional 100 houses.

Kilmarnock. — CINEMA. — Empire Picture House, Kilmarnock, Ltd., has just been registered. The registered offices of the company are at 147, Bath-street, Glasgow, and the nominal capital is £6,000. It is understood that a site for a new cinema has been secured.

Kirkintilloch. — HOUSES. — The Kirkintilloch slum clearance scheme, which involves the erection of 72 houses, has been approved by the Board of Health. The tenders amount to £24,239.

Kirkwall. — HOUSES. — Offers have been accepted for the erection of eight houses at White-street, for the Town Council.

Milngavie.—HOUSES.—The Town Council has received the Board of Health approval for the erection on Dougalston estate site of 36 houses.

Peebles.—HOUSES.—The Town Council has decided to erect more houses at the Dalatho scheme on the Edinburgh-road.

Nairn.—HOUSING.—The Housing Committee of the Town Council has estimated that the total cost of the new housing scheme at Merryton will probably amount to £6,188, or an estimated inclusive cost per house of £386 15s. It has been resolved to recommend that the scheme be proceeded with.

Perth.—GARAGES.—Plans were passed for the erection of a garage and saloon for motor-cars for Messrs. Frew Bros. in Princes-street.

Renfrew.—HOUSES.—The Renfrew Dean of Guild Court has passed plans for 88 new houses, to be known as the Blythswood scheme. The site is on the ground owned by Lord Blythswood. The new scheme will consist of tenements and cottages.

Stranraer.—HOUSES.—The Town Council has received a letter from the Scottish Board of Health, approving the acceptance of offers in connection with the proposed erection of one block of four houses at Royal-avenue.

Kilmacolm. — HOUSING. — The Kilmacolm Parish Council have secured ground for twenty-four houses, and these are to be erected on a site adjacent to the present houses on the Langbane-road, next to the children's playground.

Dundee.—BUILDINGS.—Plans and sections of proposed new buildings, &c., have been lodged at the Office of the City Engineer, to be submitted to a meeting of the Works Committee: Carlochie-place, shed for the Corporation Electricity Department; Constitution-road, Public Health Institute, for the Town Council; Hyndford-street, houses for J. & J. Hunter (architects, Messrs. Gauldie & Hardie, 26, Commercial-street).

Aberdeen.—BATHING BOXES.—The Links and Parks Committee of the Town Council has agreed to erect 100 permanent bathing boxes of reinforced concrete at the beach at a cost of £2,500.

Glasgow Slum Clearance.

An inquiry has been held by the Scottish Board of Health into the proposed improvement scheme of the Corporation, involving various slum areas. In the scheme some 1,000 houses situated in slum areas which the Corporation desire to clear away are included, together with arrangements for the erection of housing accommodation elsewhere for the dispossessed tenants.

BUILDING TRADE WAGES IN SCOTLAND.*

THE following are the present rates of wages in the building trade in the principal towns of Scotland. Every endeavour is made to ensure accuracy, but we cannot be responsible for errors that may occur:—

	Masons.	Bricklayers.	Carpenters, Joiners.	Plasterers.	Slaters.	Plumbers.	Painters.	Labourers—Masons', Bricklayers', Plasterers'.
Aberdeen	1/8	1/8½	1/8	1/8	1/8	1/8	1/7	10½d. to 1/1
Airdrie	1/8	1/8	1/8	1/8	1/8	—	1/6½	1/3
Alexandria	1/8	1/8	1/8	1/8	1/8	1/8	—	1/2½ to 1/3½
Arbroath	1/7	1/7	1/7	1/7½	1/7	1/7	1/5½	1/1½
Ayr	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/3
Bathgate	1/8	1/8	1/8	1/8½	1/8	1/8	1/6½	1/2 to 1/3
Blairgowrie	1/7	1/7	1/7	1/7½	1/5	1/7	1/4	10d. to 1/-
Bo'ness	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3
Coatbridge	1/8	1/8	1/8	1/8	1/8	—	1/6½	1/3 to 1/3½
Dumbarton	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Dumfries	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Dundee	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3
Dunfermline	1/8	1/8	1/8	1/9	1/8	1/8	1/8	1/3½
Edinburgh	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Falkirk	1/7½	1/7½	1/7	1/8	1/7	1/7	1/6½	1/2½
Fort William	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/2
Galashiels	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Glasgow	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Greenock	1/8	1/8	1/8	1/9	1/8	1/8	1/7	1/0½ to 1/3½
Hamilton	1/8	1/8	1/8	1/9	1/8	1/8	1/6½	1/3½
Hawick	1/7	1/7	1/7	1/7-1/7½	1/7	1/7	1/7	1/2½
Helensburgh	1/8	1/8	1/8	1/9	1/8	1/8	1/7	1/3½
Inverness	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/- to 1/2
Kilmarnock	1/8	1/8	1/8	1/9	1/8	1/8	1/8	1/3½
Kirkcaldy	1/8	1/8	1/8	1/9	1/8	1/8	1/8	1/3½
Kirkwall	1/5	1/5	1/4	1/5	1/5	1/4	1/4	1/-
Lanark	1/8	1/8	1/8	1/9	1/8	1/8	1/8	1/0 to 1/3
Leith	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Motherwell	1/8	1/8	1/8	1/9	1/8	1/8	1/6½	1/3½
Perth	1/8	1/8	1/8	1/9	1/8	1/8	1/6½	1/3
Stirling	1/8	1/8	1/8	1/9	1/8	1/8	1/8	1/3½
Stirlingshire (Eastern District)	1/8-1/10	1/8 1/10	1/8	1/9	1/7	1/8	1/6½	1/3½
Wishaw	1/8	1/8	1/8	1/9	1/8	1/8	1/7	1/3½

* The information given in this table is copyright. The rates of wages in the various towns in England and Wales are given on page 507.

CURRENT PRICES FOR BUILDING WORK IN LONDON

EXCAVATOR.

		s.	d.
Digging and throwing or wheeling and filling carts, and carting away to shoot—6 ft. deep	per yard cube	11	0
Add if in clay	" "	1	0
Add for every additional depth of 6 ft.	" "	0	6
Planking and strutting to trenches	per foot super	0	5
Do. to sides of excavation, including shoring	" "	1	0

CONCRETOR.

		s.	d.
Portland cement concrete in foundation 1 to 6	per yard cube	32	0
Add if in underpinning in short lengths	" "	7	0
Add if in floors 6 in. thick	" "	3	3
Add if in beams	" "	3	9
Add if aggregate 1 : 2 : 4	" "	10	0
Add for hoisting not exceeding 10 ft. beyond the first 10 ft.	" "	2	6

BRICKLAYER.

		£	s.	d.
Reduced brickwork in lime mortar and Fletton bricks	per rod	30	0	0
Add if in stocks	"	7	10	0
Add if in Staffordshire blues	"	22	0	0
Add if in Portland cement and sand	"	1	10	0

FACINGS.

		s.	d.
Extra for facing in English or Flemish bond for every 10s. per 1,000 over the price of the common bricks	per ft. super	0	0	1½

POINTING.

		s.	d.
Neat flat struck or weathered joint	" "	0	0	3

ARCHES.

		s.	d.
Extra only to the price of ordinary brickwork :—			
Fair external in half brick rings	" "	0	0	10
Axed in stocks	" "	0	1	9
Rubbed and gauged jointed in putty camber or segmental	" "	0	6	0

SUNDRIES.

		s.	d.
Damp course in double course of slates breaking joint and bedded in Portland cement	" "	0	1	0
Setting ordinary register grates and stoves	each	1	0	0
Setting kitchener, including forming flues, &c., with all necessary fire bricks	"	4	15	0

ASPHALTER.

		s.	d.
Half-inch horizontal damp course	per yard sup.	4	3
Three-quarter-inch vertical damp course	" "	8	6
¾ inch on flats in two thicknesses	" "	6	3
Angel fillet	per foot run	0	3
Skirting and fillet 6 in. high	" "	1	2

MASON.

		s.	d.
York stone templates fixed	per foot cube	13	0
York stone sills fixed	" "	22	0
Bath stone and all labour fixed	" "	10	6
Portland stone fixed	" "	20	0

SLATER.

		s.	d.
Welsh 16 in. × 8 in. 3 in. lap, including nails	per square	72	9
Do 20 in. × 10 in. Do. Do.	"	80	9
Do. 24 in. × 12 in. Do. Do.	"	90	0

CARPENTER AND JOINER.

		s.	d.
Fir framed in plates	per foot cube	5	0
Do. joists	" "	5	6
Do. roofs, floors, and partitions	" "	6	0
Do. trusses	" "	8	6

		¾"	1"	1¼"	2"
Deal rough close boarding	per sq.	35/6	40/-	45/-	72/-

		s.	d.
Flat centering for concrete floor, including struts or hangers	"	50	0
Do. to beams	per ft. sup.	1	0
Centres for arches	"	1	6
Gutter boards and bearers	"	1	0

FLOORING.

		¾"	1"	1¼"	1½"
Deal-edges shot	per sq.		44/6	53/-	60/6
Do. tongued and grooved	"		49/-	57/6	65/-
Do. matchings	"	45/-	51/-		
Moulded skirting, including backings and grounds	per ft. sup.	1/6	1/9	2/0	2/6

SASHES AND FRAMES.

		s.	d.
One-and-a-half moulded sashes or casements	per foot super.	1	10
Two Do. Do. Do.	" "	2	1
Add for fitting and fixing	" "	0	3
Deal-cased frames with 1 in. inner and outer linings, 1½ in. pulley stiles tongued to linings, hard wood sills with 2 in. moulded sashes in squares, double hung, double hung with pulleys, lines and weights; average size	" "	3	9

DOORS.

		1¼"	1½"	2"
Two-panel square framed	per ft. sup.	2/1	2/4	2/6
Four-panel Do.	"	2/5	2/8	2/11
Two-panel moulded both sides	"	2/8	2/11	3/2
Four-panel Do. Do.	"	2/11	3/2	3/5

CARPENTER AND JOINER—continued.

FRAMES.

		s.	d.
Deal wrot moulded and rebated	per foot cube	14	0

		1"	1¼"	1½"
Plain deal jamb linings framed	per ft. sup.	1/7	1/8	1/11
Deal shelves and bearers	"	1/4	1/6	1/9
Add if cross-tongued	"	2d.	2d.	2d.

STAIRCASES.

	1"	1¼"	1½"	2"	2½"
Deal treads and risers in and including rough brackets	2/1	2/4	2/9	—	—
Deal strings wrot on both sides and framed	1/8	2/-	2/2	2/8	—

		s.	d.
Housings for steps and risers	each	0	11
Deal balusters, 1 in. × 1¼ in.	per ft. run	0	9
Mahogany handrail: average 3 in. × 3 in.	" "	6	0
Add if ramped	" "	11	10
Add if wreathed	" "	23	9

FIXING ONLY IRONMONGERY (INCLUDING SCREWS).

6 in. barrel bolts	8½d.	Rim locks	2/-
Sash fasteners	11½d.	Mortice locks	4/6
Casement fasteners	1/5	Patent spring hinges and letting into floor and making good	19/-
Casement stays	1/2		
Cupboard locks	1/5		

FOUNDER AND SMITH.

		s.	d.
Rolled steel joists	per cwt.	16	3
Plain compound girders	"	19	0
Do. stanchions	"	21	9
In roof work	"	27	6

RAIN-WATER GOODS.

		3"	4"	5"	6"
Half-round plain rebated joints	ft. run	1/6	1/9	2/-	2/6
Ogee Do. Do.	"	1/9	2/-	2/6	3/3
Rain-water pipes with ears	"	1/9	2/7	—	—
Extra for shoes and bends	each	4/4	5/11	—	—
Do. stopped ends	"	1/11	2/4½	3/7	4/-
Do. nozzles for inlets	"	2/2	2/7	3/10	4/3

PLUMBER.

		s.	d.
Milled lead and laying in flashings and gutters	per cwt.	59	0
Do. Do. in flats	"	58	0
Extra labour and solder in coated cesspools	each	6	9
Welf joint	per ft. run	0	6
Soldered seam	" "	1	6
Copper nailing	" "	0	6

		½"	¾"	1"	1½"	2"	4"
Drawn lead waste	per ft. run	1/2	1/9	2/-	3/4	4/-	—
Do. service	"	1/8	2/2	2/7	3/10	—	—
Do. soil	"	—	—	—	—	—	6/9
Bends in lead pipe	each	—	—	—	—	3/3	8/2
Soldered stop ends	"	1/2	1/8	2/1	2/10	3/6	—
Red lead joints	"	11d.	1/-	1/3	1/11	2/4	4/10
Wiped soldered joints	"	2/10	3/6	4/-	4/11	6/6	9/9
Lead traps and cleaning screws	"	—	—	—	14/7	19/6	—
Bib cocks and joints	"	6/4	9/7	15/4	41/-	—	—
Stop cocks and joints	"	15/4	17/2	25/8	64/-	—	—

PLASTERER.

		s.	d.
Render, float and set in lime and hair	per yard sup.	2	4
Do. Do. Sirapite	" "	2	7
Do. Do. Keen's	" "	3	7
Add sawn lathing	" "	1	7
Add metal lathing	" "	2	6
(Not including hangers or runners, &c., for suspended ceilings.)			
Portland cement screed	per yard sup.	2	2
Do. plain face	" "	3	3
Mouldings in plaster	per 1 girth	0	1½
One-and-a-half granolithic pavings	per yard sup.	5	9

GLAZIER.

		s.	d.
21 oz. sheet plain	per foot sup.	0	8½
26 oz. Do.	" "	1	0
Obscured sheet	" "	1	1
⅛ in. rolled plate	" "	0	9
¼ in. rough rolled or cast plate	" "	0	10½
¼ in. wired cast plate	" "	1	4

PAINTER.

		s.	d.
Preparing and distempering, 2 coats	per yard sup.	0	9
Knotting and priming	" "	0	7
Plain painting, 1 coat	" "	0	9
Do. 2 coats	" "	1	2
Do. 3 coats	" "	1	9
Do. 4 coats	" "	2	4
Graining	" "	2	3
Varnishing twice	" "	1	9
Sizing	" "	0	3
Flatting	" "	0	7
Enamel	" "	1	1
Wax polishing	per foot sup.	0	6
French polishing	" "	1	2
Preparing for and hanging paper	per piece, 2/- to 4/-		

* These prices apply to *new buildings only*. They cover superintendence by foreman and carry a profit of 10 % on the prime cost without establishment charges. A percentage of 1½ should be added for Employers' Liability and National Health and Unemployment Acts and from 1s. 6d. per £100 for Fire Insurance. The whole of the information given on this page is copyright.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach him not later than Tuesday evening.

* Denotes *accepted*. † Denotes *provisionally accepted*.
‡ Denotes *recommended for acceptance*.
‖ Denotes *accepted subject to modification*.

ABERDEEN.—New gymnasium at the Causeway-end School, for the E.C. Mr. J. A. O. Allan, F.R.I.B.A., architect, 25, Union-terrace :—

Mason work—
*Adam Birnie, Peterhead..... £1,457 8 5
Carpenter work—
*R. & J. Reid, Ltd., Aberdeen.. 725 0 0
Slater work—
*Geo. Currie & Co., Aberdeen.. 134 3 0
Plaster work—
*Alex. Stephen, Aberdeen..... 166 14 3
Plumber work—
*Alex. Anderson, Ltd., Glasgow 132 6 6
Heating Engineer work—
*H. Twaddle & Son, Glasgow.. 193 0 0

ABERDEEN.—New gymnasium at the Grammar School, for the E.C. Mr. J. A. O. Allan, F.R.I.B.A., architect, 25, Union-terrace :—

Mason work—
*Adam Birnie, Peterhead..... £2,095 0 0
Carpenter work—
*R. & J. Reid, Aberdeen..... 1,055 0 0
Slater work—
*A. Harper & Sons, Aberdeen .. 293 10 5
Plaster work—
*Roger & Baxter, Aberdeen.... 164 8 0
Plumber work—
*Alex. Anderson, Ltd., Glasgow 157 18 9
Heating Engineer work—
*J. F. Anderson, Aberdeen 195 0 0

ABERDEEN.—New Intermediate School at Torry, for the Aberdeen E.C. Mr. J. A. O. Allan, F.R.I.B.A., architect, 25, Union-terrace :—

Carpenter work—
*Geo. Lyall, Jun., Aberdeen.... £7,368 0 0
Roof tiler work—
*Geo. Currie & Co., Aberdeen.. 1,106 6 6
Plaster work—
*Sellar & Co., Aberdeen..... 1,988 0 0
Asphalte work—
*Associated Asphalte Co., Glasgow 299 4 11
Plumber work—
*H. Twaddle & Son, Glasgow.. 1,790 0 0
Painter work—
*K. Mackintosh, Aberdeen 973 15 0
Blacksmith work—
*Shirras, Laing & Co., Ltd., Schoolhill 406 1 6
Heating Engineer work—
*H. Twaddle & Son, Glasgow.. 2,085 0 0
Electrical work—
*A. McRobb, Aberdeen..... 601 0 0

AYLESBURY.—Sixty-two houses at California, for the T.C. :—
*Webster & Cannon..... £26,888

BRISTOL.—Painting work, for the T.C. :—
Ham Green Hospital—
*A. Walker & Son £515 16 6
Municipal Lodging House, Wade-street—
*E. Walters & Son 147 10 0
Novers Hill Hospital and Disinfecting Station—
*W. Ash & Son..... 131 10 0
Frenchay Park Sanatorium—
*W. Leat & Sons..... 118 0 0

BYFLEET.—Twenty-eight houses, for the R.D.C.:—
*W. J. Drowley, Woking..... £14,287

CARDIFF.—Rebuilding of 28, St. Mary-street, for the Royal London Mutual Insurance Society, Ltd. Messrs. H. Bugden & Co., 95, St. Mary Street :—

J. Jarvis & Sons, London.... £13,966 0 0
Higgs & Hill, Ltd., London.. 13,270 0 0
Wm. Griggs & Sons, London.. 13,241 19 5
E. A. Bond & Co., Cardiff.... 11,710 0 0
F. J. Thomas, Cardiff..... 11,250 0 0
Wm. Thomas & Co., Cardiff.. 11,040 0 0
Wm. Symonds & Sons, Ltd., Cardiff 10,699 0 0
Wm. Rowles, Cardiff..... 10,483 10 0
*J. E. Evans & Co., Cardiff.... 10,189 0 0

CHAPEL-EN-LE-FRITH.—Seventeen non-parlour houses at Town End, Chapel-en-le-Frith, and nine at Jenny-lane, Bugsworth, for the R.D.C. Mr. T. Dinsdale, Inspector and Surveyor :—

Eleven houses—
*J. & G. Mellor, Chapel-en-le-Frith £5,962 0 0
Six houses—
*H. Troop, Chapel-en-le-Frith.. 3,204 0 0
Nine houses—
*J. Fielding, Buxton..... 4,934 5 10

CHEADLE.—Sanatorium at Belmont, for the Trustees. Messrs. Dunkerley, Taylor & Young, architects, Manchester :—
*M. Lane, Ltd., Stockport.

CONONLEY.—Eight houses at Alreside Mills. Messrs. Haggas & Sons, architects, North-street, Keighley :—

Mason—
*H. J. Ralstrick.
Joiners—
*Cowling Bros.
Slater—
*Thos. Throup.
Plasterers—
*J. Greenwood & Sons.
Plumber—
*H. Mitchell.
(All of Keighley.)

DENBY.—Wall fencing from Kaye-lane to junction of Rockwood Lodge, for the Denby and Camberworth U.D.C. :—
*Ed. Benson £400 15

DUNOON.—Repairs to the goods gangway at Dunoon pier, for the T.C. Mr. William Rodger, Pier Engineer. Quantities by the Engineer :—

Harland & Wolff, Ltd., Greenock £6,170 1 9
H. M. Murray & Co., Ltd., Glasgow 5,606 7 2
Geo. Halliday, Ltd., Rothesay 5,325 16 6
R. Hunter, Glasgow 4,973 14 10
A. Stark & Sons, Ltd., Glasgow 4,764 3 0
John Macdonald, Inveraray .. 4,697 15 7
John Bannatyne, Irvine 4,459 3 10
Alex. D. Ferguson, Dunoon.... 4,417 9 8
*McLeod & Laver, Kirn..... 4,373 15 5

DUNBLANE.—Reconstruction of Victoria Hall, Dunblane. Messrs. E. Simpson, M'Michael & Davidson, architects, 16, Kings-street, Stirling. Quantities by architects :—

Masons—*Nelson & Monaghan, Dunblane.
Steel—*P. & R. Fleming & Co., Glasgow.
Joiners—*J. & W. Guthrie, Dunblane.
Slater and roughcast—*P. & D. Williamson, Dunblane.
Plumber—*John Kerr, Dunblane.
Asphalte—*Speedwell Co., Glasgow.
Plasterer and concrete—*Alex. Walls, Stirling.
Floors—*F. Morton, Junr., & Co., London.
Windows—*H. Hope, Birmingham.
Heating and Ventilating—*J. Deas & Co., Glasgow.

HASLEMERE.—Twenty-four houses on the High-lane site :—
*A. Husband £11,019

HUCKNALL.—Twenty-four houses, for the U.D.C. :—
*S. Johnson

KNARESBOROUGH.—Erection of 20 houses, for the U.D.C. Mr. S. Blenkhorn, architect and surveyor, Bank Chambers, High-street :—

Excavators, concretors, bricklayers and drains—
*Pearson & Blackwell, Doncaster £4,438 12 0
Tilers—
*Dawber, Townsley & Co., Darlington 525 16 8
Carpenters and Joiners—
*Pearson & Blackwell, Doncaster 2,126 6 6
Plasterer—
*Mark M. Bartholomew, Knaresborough 652 13 2
Plumber and glazier—
*A. W. Clegg, Knaresborough 1,561 0 0
Painters—
*Pearson & Blackwell, Doncaster 248 15 0

LEEDS.—Depot and garage in Roseville-road, for the Harrogate and District Car Co., Ltd. Mr. G. W. Atkinson, architect :—
*W. Gott & Son £6,300

LONDON.—Tenders accepted for August by H.M. Office of Works :—

Building Works: Aberdare, maintenance work—painter: B. Bennett, Aberdare; plumber: D. J. Davies, Aberdare. Bishop Auckland, Kingsway Employment Exchange—erection: G. C. Young Constructions, Ltd., Bishop Auckland. Bristol, Kingswood Employment Exchange—erection: H. J. & A. Wright, Ltd., Great Missenden. Crawley P.O., &c.—steelwork: Charles Ross, Ltd., Sheffield; stonework: A. Bursiem & Son, Ltd., Tunbridge Wells. Croydon Telephone Exchange—glazier: James Clark & Son, Ltd., London, S.E.; plasterer: Telling Bros. London, S.E. Exeter Telephone Exchange—patent glazing: H. Hope & Sons, Ltd., London, W. Garston, Watford, Building Research Station—erection of workshops, &c.: C. Miskin & Sons, Ltd., St. Albans. G.P.O. (West), E.C.—steelwork: E. C. & J. Keay, Ltd., Birmingham. Harrow Telephone Exchange—alterations, c.: The Actonia Building Co., Ltd., London, N.W. Hatch End Telephone Exchange—erection: The Actonia Building Co., Ltd., London, N.W. Jedburgh P.O.—glazier: R. Mitchell, Jedburgh; joiner: A. Inglis & Sons, Jedburgh; painter: R. Wright, Jedburgh; plasterer: W. J. Aitken, Jedburgh; slater, &c.: A. Oliver & Son, Jedburgh; steelwork: Redpath, Brown & Co., Ltd., Edinburgh. Manchester, 76, Newton-street—alterations, &c.: W. D. Scott & Co., Manchester. Middlesbrough, Nelson-street Employment Exchange—erection: Norman Thompson, Middlesbrough. National Gallery, S.W.—glazier: George Farmiloe & Sons, Ltd., London, E.C. Newcastle-on-Tyne, 81, St. Mary's-place—alterations, &c.: J. Middlemiss Bros., Newcastle-on-Tyne. St. Alban's Head Coastguard Station—alterations, &c.: Parsons, Hayter & Sons, Swanage. St. Mary's, Scilly Isles, Coastguard Station—repairs, &c.: A. J. Trenear & Sons, St. Mary's. "Strand" Telephone Exchange, W.C.—glazier: George Farmiloe & Sons, Ltd., London, E.C. Thorpe Bay Telephone Exchange—steelwork: Powers & Deane, Ransomes, Ltd., London, E.C. Wakefield, Sandal Telephone Exchange—painter: Charles Turner & Sons, Wakefield; plumber, &c.: Samuel Atkinson, Ltd., Wakefield; steelwork, &c.: D. T. Brown, Son & Co., Liverpool. Wallington P.O., &c.: plasterer: J. Fisher, Epsom. Walsall P.O., &c.—slater: Ellis, Partridge & Co., Ltd., Leicester. Ware P.O., &c.—erection: F. Hitch & Co., Ware. Watford Station Sorting Office—erection: Fairweather & Ranger, London, W.C.

Engineering Services: Teddington, National Physical Laboratory—transformers: Ferranti, Ltd., Hollinwood.

Painting: W. G. Beaumont & Son, London, E.; Campbell Bros., Ltd., London, S.E.; W. H. Grigg, Dover; A. Hutton & Son, Edinburgh; F. Troy & Co., Ltd., London, N.W.

LONDON.—Tenders accepted by H.M. War Office for August :—*Building Works and Services*: Brighton, Preston Bks., erection of married soldiers' quarters: J. B. Edwards & Co., London. Woolwich, repairs to W.D. roads: E. J. Logan, London. Devonport and Plymouth, periodical painting: C. J. Else & Co., Ltd., Matlock. *Installations*: Catterick Camp, heating apparatus: Dilworth & Carr, Ltd., Preston. Aldershot, Wellington Lines, heating and hot-water services, Regimental Institutes: Manley & Regulus, Ltd., Wolverhampton.

LONDON.—Reconstruction of the Canal Bridge in Kentish Town-road, for the St. Pancras B.C. Messrs. L. G. Mouchel & Partners, Ltd., Consulting Engineers :—

	Whole Contract.	Part No. 1.
G. E. Wallis & Sons, Ltd. Maidstone	£5,600 0 0	£1,200 0 0
John Garrett & Son, London	5,500 0 0	1,150 0 0
Holloway Bros., Ltd., London	5,450 0 0	1,110 0 0
J. & W. Stewart, London	5,382 18 1	951 11 8
Arthur J. Arnold, Chelmsford	5,330 1 8	1,055 5 0
‡W. & C. French, Buckhurst Hill	5,118 15 6	997 10 0

LONDON.—Alteration and extension to the electricity sub-station at Evelyn-street, Hoxton, N.1, for the Shoreditch B.C. Mr. T. L. Hustler, Borough Surveyor, Town Hall, Old-street, E.C. :—

R. Marshall & Sons..... £7,425
Patman & Fotheringham 7,196
A. E. Symes 7,177
W. J. Cearns..... 6,850
Tersons, Ltd..... 6,768
R. Schooley & Son..... 6,729
(All of London.)

LOUGHBOROUGH.—One hundred houses on the Shelthorpe site, for the T.C. :—
Bosworth & Lowe, Nottingham .. —
Loughborough Building Trades Association ..... —
*J. Chapman & Sons, Ltd., Leicester.. £51,260

NANTWICH.—Veranda for Infirmary, for the B.G. Mr. C. E. Davenport, architect, 152, Hospital-street :—
W. H. Schofield, Nantwich.... £251 7 7
*J. T. Gresty & Sons, Nantwich.. 180 0 0

MANCHESTER.—Additions to the foundry at Unwin-street, Salford, for Messrs. Kennish & Co., Ltd. :—

Building work—
*Halls' Construction Co., Ltd., Pendleton.
Steelwork—
*E. Wood & Co., Ltd., Trafford Park.

NEWCASTLE.—Construction of a deep water quay, with transit shed, passenger platform, railways, &c., at the Albert Edward Dock river wall, for the River Tyne Commissioners :—
*Brims, Newcastle.

NEWCASTLE-UPON-TYNE.—Gates for the nurses' new home, Westgate-road, for the B.G. Messrs. Harrison & Ash, architects, 22, Ellison-place :—
*M. Aynsley & Sons, Ltd., Newcastle-on-Tyne

OAKLEY.—Sixteen almshouses for the Trustees of the Sydney Howard Lorsall Memorial. Mr. Ivan Daughty, architect, 1, Saint Paul's-square, Bedford :—
*S. Foster, Ltd. £11,649

ONGAR.—New smithy at Moreton, for the R.D.C. Mr. H. C. Phillips, District Surveyor :—
H. G. Acres, Ongar £240 0
*Noble & Son, Ltd., Ongar 234 5

OSSETT.—Extensions to the Healey Mission Room, Healey-lane. Messrs. C. H. Marriott, Son & Shaw, architects, Church-street Chambers :—
*J. W. Thornton, Dewsbury.

PENRHYN.—Twenty-two houses, with roads and sewers, on the Helston-road site, for the T.C. Mr. P. Edwin Stephens, A.R.I.B.A., Midland Bank Chambers, Falmouth :—

J. Lobb, Mevagissey £13,180 0
P. Williams, Stithians, near Falmouth 12,855 0
T. Rundle, Fowey 12,150 0
C. Williams, Constantine, near, Falmouth 11,400 0
J. R. Johns, Falmouth 11,024 0
F. Mitchell, Camborne 10,450 0
*Barnicoat & Porter, Mylor, near Penrhyn 9,993 10

PORTSMOUTH.—Alterations and additions to 5, Granada-road, for Mr. W. H. Homes. Messrs. Thomas & Wilkins, architects and surveyors, 30, Landport-terrace, Southsea :—
*John Lay & Co., Portsmouth.

PORTSOY.—Twelve houses, for the T.C. :—
Mason work—*W. K. Gray, Portsoy.
Carpenter work—*Geo. Milne & Sons, Huntly.
Plumber work—*A. F. Wilson, Portsoy.
Slater work—*Chas. Dickie & Son, Turriff.
Plasterer work—*A. T. Hutcheon, Banff.
Painter work—*Bain & Barron, Portsoy.

ROCHDALE.—Masonic hall, off Drake-street, for the Rochdale Lodge of Freemasons. Messrs. M. Smith & Cross, architects, Town Hall-chambers :—
Building work—*W. H. Ashworth & Sons, Ltd., Rochdale.
Steelwork—*Robinson & Kershaw, Ltd., Manchester.

ROCHDALE.—Electricity sub-station in Mere-lane, for the Corporation. Mr. S. H. Morgan, Borough Engineer :—

*J. H. Kershaw, Rochdale.

SALE.—Thirty non-parlour type houses in Symons-road, for the U.D.C. Mr. E. Bleakley, surveyor :—

*J. E. Deant & Sons, Ashton-upon-Mersey £14,221

SANDERSTEAD.—House, for Mr. W. King. Mr. C. E. Hanscomb, F.R.I.B.A., architect, Station-approach, Sanderstead :—

*S. H. Palmer, South Croydon..... £1,838 10

SHEFFIELD.—General builder's work required in connection with the installation of filtration plant at Glossop-road baths, for the T.C. Mr. W. G. Davies, City Architect :—

*Wellerman Bros., Ltd., Sheffield.

SOLIHULL.—Lapworth (six houses), Station-road and Hockley Heath (six houses), Aylesbury-road and Stratford-road, for the R.D.C. Messrs. Ewen Harper, Bro. & Co., architects, Ruskin-chambers, 191, Corporation-street, Birmingham :—

	Lapworth.	Hockley Heath.
Harry B. Tarleton, Redditch	£3,198 ..	£3,198
T. Johnson, Birmingham ..	3,180 ..	3,210
E. Thompson & Co., Ltd., Birmingham	2,955 ..	2,970
Houghton & Sons, Ltd., Birmingham	2,970 ..	2,970
*E. L. Lewis, Redditch	2,835 ..	2,835

SOUTHAMPTON.—Additions and alterations at the Tramway Offices, for the Corporation. Mr. P. J. Baker, General Manager and Engineer :—

H. Stevens & Co.....	£3,795 0
W. Saunders & Sons	3,688 0
Jenkins & Son.....	3,485 0
J. Bates	3,484 10
Brazier & Son.....	3,085 0
*W. A. Fussell & Co., Ltd.....	2,943 0

(All of Southampton.)

SOUTH CROYDON.—House, for Mrs. A. Heading. Mr. C. E. Hanscomb, F.R.I.B.A., architect, Station-approach, Sanderstead :—

*B. Brown, South Croydon £1,500

SOUTH HIENDLEY.—Elementary Council school, for the West Riding C.C. :—

*A. Gregory & Sons, Ltd.

CONWAY.—Seventy-six houses, for the U.D.C. :—

*W. E. Hughes, Birkenhead £13,400

SPILSLEY.—Eight houses in the parish of Croft, for the R.D.C. Surveyor, Council Offices, Burgh :—

Atkinson & Son, Brigg	£3,932
Turner & Sons, Wainfleet	3,780
W. Greetham, Skegness.....	3 580
*Vamplew Bros., Boston	3,451

STOKE-ON-TRENT.—Works required in connection with the alterations to Block "A." London-road institution, for the B.G. Mr. A. R. P. Piercy, architect, Union Offices :—

*Palin Bros., Tunstall £1,700

SWILLINGTON (W. YORKS).—Eighteen houses, for the Tadcaster R.D.C. :—

*L. J. Gallagher & Son £7,290

TIVERTON.—Six parlour houses and six non-parlour houses at Dicker's Field, Birchin-lane, for the T.C. Mr. A. M. Kinnison, Borough Surveyor :—

W. Lambshead, Dawlish—	
Six parlour	£4,128 0
Six non-parlour	3,750 0
J. Grater & Son, Tiverton—	
Six parlour	2,722 10
Six non-parlour	2,389 0
*Bamsey & Marshall & Co., Tiverton—	
Six parlour	2,700 0
Six non-parlour	2,343 0

(Subject to sanction of the M.H.)

URMSTON.—For the heating of the Council Offices, Crofts Bank-road, for the U.D.C. Mr. J. Heath, surveyor :—

*W. L. Crumblehulme, Bolton..... £155 10

WEST STOKE.—Six houses, for the Westhampnett R.D.C. :—

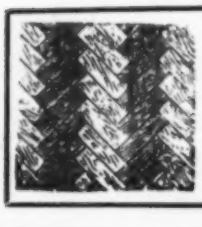
*A. Booker & Son, Walburton..... £2,593

WHARFEDALE.—Twelve parlour houses and 14 non-parlour houses on the Stockshill estate, for the R.D.C. Mr. H. Riding, Menston :—

*W. J. & R. Turnbull, Leeds.

WOLDINGHAM.—House, for Mrs. D. Yeo. Mr. C. E. Hanscomb, F.R.I.B.A., architect, Station-approach, Sanderstead :—

*J. A. Pettitt & Co., Warlingham £5,243



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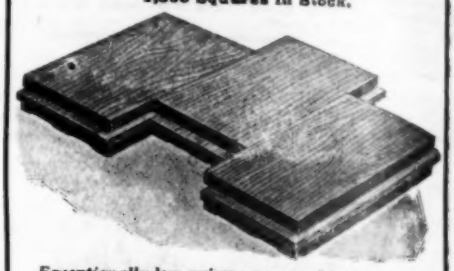

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